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LECTURES.

LECTURES ON INTRACRANIAL SURGERY.

II.—MENINGEAL HEMORRHAGE AND ITS SURGICAL TREATMENT.

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Since Macewen, in 1879, opened the skull of a boy and removed two ounces of fluid and coagulated blood from beneath the dura in the lower part of the Rolandic area, with recovery, operations for meningeal hemorrhage have been too numerous and the results too brilliant to admit of discussion of the propriety of operative procedures whenever the site of bleeding is accessible. All progressive surgeons now agree with this statement, basing their opinion upon such statistics as those of Weisemann (*Deutsche Zeitschrift für Chirurgie*, 1885) which give 147 cases treated by the expectant plan, with 131 deaths and only 16 recoveries—a mortality of more than 89 per cent.—while 110 cases subjected to operation gave 30 deaths and 80 recoveries, a reduction of the death rate to about 27 per cent. This position assumed by operative surgeons is further strengthened by the fact that not a single death has ever been recorded from the operation itself, though a few deaths have followed from the gravity of the injury.

Hemorrhages within the cranium are, in the order of their frequency, in the caudate and lenticular nuclei; in the meninges; just beneath the cortex; in the centrum ovale; in the optic thalamus; and in the pons. Those occurring in the meninges are grouped as:

1. Extradural—between the dura and the skull.
2. Subdural—beneath the dura.
3. Subarachnoidal—in the subarachnoidean space.

The first variety is always due to injury and may be either rapid or slow in development. The second class is closely allied to hematoma of the meninges (pachymeningitis interna) but it is claimed that the hemorrhage occurs before the formation of the investing membrane and is less circumscribed. In the third variety the blood may be widely disseminated; being more or less intimately mixed with the cerebrospinal fluid it is apt to gravitate toward the base and be beyond the reach of the surgeon.

The objects in view in opening the skull are:

1. Locating the point of the hemorrhage.
2. Removing the blood clot.
3. Arresting further bleeding by: *a*, location of the ruptured vessel and ligation; or *b*, the application of a tampon of iodoform gauze.
4. Drainage in cases so demanding.

The symptoms of meningeal hemorrhage differ according to the origin. When the effusion of blood is due to the rupture of a large vessel at the base of the brain, there will be intense coma with probably no other symptom; when from a smaller vessel there may be such prodromata as giddiness, headache and vomiting, coma still being pronounced if of basal origin. As a rule it may be said that in cases of suspected meningeal hemorrhage other than at the base of the brain, convulsions rather than paralysis constitute the marked symptom. So, too, it may be broadly asserted that when symptoms of cerebral trouble of any character make their appearance some hours after an injury to the head, the probabilities are so strongly in favor of meningeal hemorrhage as to justify opening the skull at the point of injury if known—if not, then at the location of the middle meningeal artery; for a blow upon the skull may cause a laceration of some intracranial vessel giving rise to immediate symptoms of acute hemorrhage, or it may result in a slow "secondary" hemorrhage with gradual supervention of the symptoms. Illustrative of the first kind, I quote the following from my case records:

Osy S., colored, aged 35, on Dec. 1, 1891, was found unconscious upon the street at 6 P.M., and carried to his home where he was seen by Dr. E. von Quast at 10 P.M. A diagnosis of rupture of the middle meningeal artery was made and at midnight I was called to operate. The symptoms then were profound unconsciousness, frequent and severe convulsive movements of the right arm and leg, dilatation of the pupil, stertorous respiration and temperature of 102½ degrees. Examination showed no evidence of fracture nor even of bruising of the scalp. Assisted by Drs. von Quast and C. H. Adams, I opened the skull over the region of the middle meningeal artery. Upon uncovering the vessel a complete rupture of the artery was found, the spurting being resumed as soon as the bone was removed. The end was caught without difficulty, the vessel tied and a clot the size of a large orange removed. This clot was extradural. The space between the skull and the dura which had been occupied by the clot was washed out, iodoform gauze drainage inserted and the scalp sutured and dressed with sublimate gauze. After removal of the clot the brain did not return to its normal position—so an opinion was given that death would be the result inside of twelve hours. He died at 7 A.M.

The autopsy showed degeneration of the vessels probably syphilitic. Complete collapse of the ventricles had occurred from pressure of the clot and there was a very marked anemic condition of all the intracranial structures.

I am of the opinion that this man's life might have been saved had trephining been possible soon after the accident, before the clot became so large as to produce the excessive pressure upon the vital structures.

Illustrating the second class of cases, I take this record from my note book:

Tod K., aged 13 years, fell and rolled down a bluff, a distance of sixty-five feet, striking upon his head. The accident happened at 11 A.M., May 16, 1891. He was not unconscious when conveyed to his home and a physician declared his wound not a serious one, washed the lacerated scalp and applied an antiseptic dressing. At 1 P.M., the boy began to become drowsy and vomited repeatedly. At 2 P.M., I found him almost unconscious, pulse very weak, skin of a purple color and "shock" pronounced. There was a cut in the scalp about two inches long to the left of the median line, just behind the parietal eminence, but no indication of fracture. At 3 P.M., with the assistance of Dr. John Wilson, I enlarged the opening in the scalp and turned back a flap, revealing a fracture of the parietal bone, with a slight depression nearly

two inches across. The fracture had been hidden by the scalp's slipping over it and by the boggy swelling of the soft parts. A small opening was chiseled and an elevator introduced, but the depressed bone could not be thus raised, so the hole was enlarged. Much blood came away at this time, and there was considerable bulging of the brain through the opening, the protruding matter being pulseless. A sharp fragment of the vitreous plate was found projected through the membranes into the brain tissue. Upon raising the depressed bone into position and slitting the dura, a large subdural clot was readily removed, allowing the brain to resume its natural position; pulsation at once returned in it and simultaneously the purple hue of the skin began to fade. The clot came from a tear in the posterior branch of the meningeal; to prevent further mischief the vessel was tied with catgut carried around it by a curved needle. All clots and fragments having been removed, the wound was irrigated with hot water, the cut in the dura closed with fine catgut, a small strip of iodoform gauze placed next to the dura and allowed to protrude through the scalp-wound for drainage and catgut sutures introduced through the scalp; with bichlorid dressings. At 10:30 P.M. the temperature was normal, there was no pain, the patient was bright and cheerful. May 17 at 3 P.M. the condition was excellent —pulse 90, temperature 99⅕ degrees. On May 18, I removed the drainage and applied a permanent dressing of sublimate gauze, there being no indication of pus formation. Convalescence was uneventful, the wound healing by primary union and the patient being discharged May 31, entirely well. There has never been any evidence of trouble since.

As I have already stated, the symptoms following an injury may occur soon after the accident but more often appear gradually, the bleeding slowly continuing until either the tension checks it by pressure or a fatal compression is induced. Bauduy, of St. Louis, describes the latter as "progressive extradural hemorrhage," a variety that is often mistaken or escapes us; it is commonly due to a blow upon the head with a blunt instrument, like a sand-bag, or a fall upon the head. The dura may be detached from the inner surface of the cranial vault and a slow hemorrhage occur which does not necessarily come from a rupture of the meningeal vessels or even of their small branches. The bleeding has its source in the laceration of the small vessels which everywhere pass from the dura to the bone. As the blood, little by little, escapes, the dura is gradually pushed away from the bone and the collection increases in size until symptoms of compression gradually supervene; after a period of many hours the patient becomes soporose and finally comatose. It should be remembered that all this may occur without fracture or even external contusion.

The only case of this kind I have operated on is this:

Charlie S., age 10 years, was brought to my clinic Oct. 3, 1892, by Dr. A. J. Kelley, who had been consulted on account of a partial blindness, a headache and gradually increasing drowsiness of the boy. The father said the child was struck upon the right side of the head nearly three weeks before (the mother said it was only a week) with a board in the hands of a playmate; that he was unconscious for a little while and vomited, but resumed his play, complaining of nothing but the soreness of the "lump" which appeared where he was struck. For several days (exact time not obtainable) he showed no signs of trouble, but finally became indisposed and said he could not see well; a few days later occipital headache appeared and a stupor came on from which he could be aroused only with great difficulty. At the time of examination there was bilateral hemianopsia (blindness of corresponding sides of both eyes) of the left side, slight ataxic gait, sluggish pupils, and a tendency to sink into a stupor from which he could, with some effort, be aroused for a time.

There was no external evidence of injury. Recognizing the danger of delay, I operated within an hour after examination, assisted by Dr. Kelly and a student, opening the skull over the middle occipital convolutions—the point indicated by cerebral localization, and corresponding nearly to the place designated by the parents as the spot injured. Upon removing the button, a lot of half clotted blood bulged from the opening. The quantity expelled was so great that I feared there had been an injury to and subsequent leakage from either the lateral sinus or the superior longitudinal. I therefore very cautiously removed the blood with a spoon and pieces of gauze. No source of the hemorrhage could be found, but a little oozing continued after irrigation. So I packed the wound (not very tightly) with iodoform gauze, closed the external cut except at the point of protrusion of gauze, and dressed antiseptically. There was no injury to the dura. Reaction was prompt and satisfactory. The temperature rose to 100.5 degrees on the second day but fell by the evening of the third, when the drain was removed. No more bleeding had occurred, but a few strands of catgut were inserted in the dura to continue drainage for a short time. All bad symptoms disappeared upon removal of the gauze packing. Convalescence was rapid and the boy was still in excellent health some months ago, although there is still pulsation at the point of trephining.

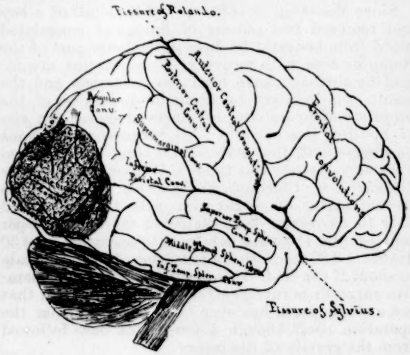

Diagram showing location of the clot.

This diagram represents the location of the blood, the dark area showing its approximate extent. About three tablespoonfuls of blood were removed.

Ransohoff, of Cincinnati, has noticed that in addition to these symptoms of hemorrhage there is a high specific gravity of the urine (1030 to 1040) with the presence of sugar.

In some non-traumatic cases it will be impossible to make a diagnosis between meningeal and cerebral hemorrhage, though the differentiation can sometimes be made. But even if one be certain in the diagnosis, operation is not to be made if the heart's action is much affected in its rhythm, depressed, the respiration irregular and swallowing difficult—the difficulty is probably of the subarachnoidean variety with involvement of the pons and medulla; trephining would be useless.

Small clots upon the convexity usually cause convulsive movements, but they may also produce monoplegia, amnesic or ataxic aphasia, hemianopsia, etc., in which case location of the lesion is easy, particularly if the patient be within one of the periods of life especially prone to this form of hemorrhage, viz.: below 10 years or over 50 years, it being generally acknowledged that the veins as well as arteries are very liable to rupture when young children are injured in the head, while in the elderly, atheroma predisposes to the same accident. In a large proportion of cases as the cause is an injury the condition can be recognized readily.

When there is an injury the wound indicates the site for operative procedures. If there be no external guide, dependence must be placed upon localizing signs, providing they be sufficiently positive. Otherwise in suspicious cases one is justified in opening the head over the region of the middle meningeal artery which, according to Treves, crosses the anterior and inferior angle of the parietal bone at a point one and one-half inches behind the external angular process of the frontal bone and one and three-quarter inches above the zygoma. The center-pin of the trephine should be inserted one and one-half inches behind the external angular process and one inch above the zygoma. Should the hole show no hemorrhage it may be enlarged upward and backward, or a second button may be removed just below the parietal eminence, this point being over the posterior branch of the artery.

The time of selection for operation is not later than eighteen to twenty-four hours after the hemorrhage, and yet the surgeon should not hesitate to operate much later than this, since the clot may remain for months, as in the case reported by McBurney, of New York, in which he trephined four months after the injury and removed a clot which was still unabsorbed and causing trouble—securing a favorable result.

If the patient be unconscious no anesthetic is necessary. The method of opening the skull must depend upon the instruments at hand or the operator's choice between the trephine, the mallet and chisel, and the gouge and rongeurs. The clot when discovered should be removed by the fingers or forceps and the irrigator allowed to flow into the cavity for a minute or two, so that all remnants of blood may be washed out and any bleeding vessel uncovered. If a ruptured vessel be found in the dura, it must be ligated by catgut passed beneath it with a curved needle, and tied securely. If the main artery in the bony canal be the source of trouble, the bleeding may usually be controlled by punching with the sharp end of the handle of the bone forceps; in extraordinary cases it may be necessary to crush the bone upon the vessel by strong sequestrum forceps. Vessels in the pia and beneath, like the Sylvian, can be readily caught by passing a fine curved needle beneath, carrying a catgut ligature for tying. Not much force should be used in ligating vessels in this location for the reason that they rupture very easily under even moderate strain. When a general oozing is found, or hemorrhage from points not accessible, the only method to pursue is to pack with iodoform gauze, then close the scalp wound and apply a firm compress over all; the tampon should be removed in thirty-six to forty-eight hours.

In conclusion, I give you this summary, under the heading of

RULES FOR TREPHINING.

When to Operate.—1. An injury to the head, followed after a little time by marked cerebral symptoms, imperatively demands trephining at the point of injury if known; if not, then over the middle meningeal artery of the affected side.

2. In progressive or extradural hemorrhage—caused by a fall on the head or a blow from a dull instrument like a sand-bag—if symptoms of compression appear after many hours, or even days, there being no fracture or contusion as a guide, it is proper to open the skull over the middle meningeal artery; if no trouble be found there, then over the posterior branch.

3. Cases of "compression" or "concussion" without localizing symptoms or external evidence of injury should be subjected to exploration if there be no return of consciousness within eighteen hours at the farthest; upon both sides if necessary.

4. Giddiness, headache and vomiting, with stupor and convulsions of one side, may be due to meningeal hemorrhage; exploration is permissible.

When not to Operate.—1. When the heart's action is depressed, respiration irregular and swallowing difficult, the hemorrhage is probably subarachnoidean and operation can not be of benefit.

2. In cases dependent upon fracture, if blood be discharged from the mouth or ear there is basal injury and the justifiability of operation is questionable

ORIGINAL ARTICLES.

SOME POINTS PERTAINING TO THE PRESENT PATHOLOGIC AND THERAPEUTIC STATUS OF DIPHTHERIA.

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It will be admitted that until recently the management of diphtheria upon the part of the medical profession as well as many other diseases, has been empirical. Since the definite cause of this disease has seemed to be established, we have been able to work more intelligently in our treatment. It must not be forgotten, however, that able men in the profession do not yet accept the germ theory of disease. Among the number so great a man as Dr. Lawson Tait affirms his disbelief. He is of the opinion that these organisms abound and multiply under two conditions or states—decomposition and disease. He thinks their presence is incident to but not causative of disease. To illustrate his idea, he presents the homely illustration of the dead animal under the mid-summer sun. The prolific development of tissue destroyers in the form of maggots from microscopic parasites does not demonstrate to him that the maggots had anything to do with the death of the animal, but that the vitality of the latter, having been reduced to zero, the maggots, germs and spores utilize the opportunity for vital development upon their own part. He with others, believes that the various organisms operating under the conditions of disease and decomposition, attempt to act as scavengers for the removal of effete matter and perverted secretions and excretions rather than as the causes of morbid conditions. Discussing this subject before the Birmingham Midland branch of the British Medical Association last October, Mr. Tait threw hot shot against the germists by citing the difference of opinion among dermatologists regarding the parasitic origin of eczema; he quotes many of their best observers who believe that it is of neurotic origin and that microbes have nothing to do with it. He aptly says that if we can not settle upon the germ as being the cause of a disease so superficial, so exposed to view, so universal and so open to study as eczema, that there are few cases where it is capable of settlement. We can many of us sympathize with Tait when he says: "I entered my college career just as the grand sweep of the cellular pathology was careering over the medical world. Everybody was mad after a new cell. Special courses and special

teachers were told off for cellular instruction. Our microscopes had got so far as to unriddle the facts of cellular construction, and therefore there must be a cellular pathology which was to explain everything. Two parties existed and they fought bitterly, the only real and permanent effect being that the unhappy student had to meet two sets of examiners and to know two sets of answers to the same questions; the one to be given as the wind blew from the east, the other as the turn of the west wind came. The cellular party apparently triumphed, but it has silently and mysteriously disappeared, so that we may ask with Hans Breitman: "Where is dad barty now?"

In his paper, Tait refers to a contribution of Dr. Leslie Roberts in a recent number of the *British Medical Journal* on the pathology of vegetable hair parasites, and remarks that it interested him greatly because it was a phase of the dermatologic investigation getting as near the laboratory flasks as seems possible. Tait makes a note of the lack of unity of opinion on the part of dermatologists, with reference to the pathology of vegetable hair parasites. He suggests that from a bacteriologic standpoint they are no further advanced than botanists were in the times of Gussieu and Linnæus, and that the philosophical revolution affected by Darwin has not yet reached them, and refers sarcastically to the amount of drivel that is made to center around the culture tube. He very tersely says: "What should we say if an investigator provided to classify the trees in an orchard by the shape of their branches or the color displayed by their fruit?" He says logic can not change with the size of the objects or with the apparatus and manipulation. He decries the rapidly appearing successive memoirs which are self-contradictory and which are objectionable and unusual in scientific research, and suggests to us all the necessity of reserving judgment. Indeed he says, many of the opinions maintained so strongly regarding bacteria have passed into medical currency with very little inquiry on the part of those who have reached them. He says their work is carried on without regard to the first principles of Bacon and with an utter disregard to the teachings and examples of Darwin. "The very fundamental thoughts of the evolutionary school of biology are brushed aside, and the great text-book of Sachs might as well have never been written."

Tait criticises the application of Pasteur's law which he so wonderfully illustrated in the process of brewing and wine fermentation, which were of such enormous financial value to the interests involved, as not being applicable to the human body, and says that Pasteur was responsible for leading wildly astray many young doctors who had never studied Bacon and were incapable of grasping the fact that while the former might be wholly right in the brewing vat, it required a re-arrangement of the syllogisms to carry the argument to the human body. For instance, take ten thousand human bodies all perfectly alike, as far as we can see, and drop your germs of typhus about and see what will happen. The first remarkable fact to be found is that if the bodies are in Birmingham there will probably be no effect at all. If they are in Edinburgh, no effect, or very little will be seen in the new town; whereas in the old town some commotion will result and there will be about a hundred cases of typhus. These will be distributed in various centers with mathematical proportion, and probably no two cases will be exactly alike. Clearly then, according to Bacon, the provocative cause lies not in the germs.

We can not ignore some of the bacteriologic perplexities which confront us, however loyal we may be to the germ theory.

1. Pneumococci may exist in the air passage without producing pneumonia.

2. The bacilli coli (which are constantly at home in large numbers in the large bowel) are believed by some to be essentially the same as the typhoid fever bacillus of Eberth and to develop the same biologic and pathogenic characteristics when the soil is favorable. Indeed it is freely stated that the Klebs-Löffler bacillus is often found among the many scores of bacteria infecting apparently healthy mouths.

In a recent paper Bleyer says: "To-day we know with almost absolute certainty that there are two forms of diphtheria, which to the eye of the clinical observer present similar changes in the mucous membrane, inasmuch as both are characterized by the appearance of a pseudo-membrane, at times dirty white, often tinted greenish or yellow white in color. Viewed at the bedside alone, in both you will observe alike, prostration, a febrile condition, swelling of the submaxillary glands, disturbance of respiration often slight it is true, so that a differential diagnosis, clinically, is a qualification to which few of us can lay claim. Notwithstanding this, the two are totally dissimilar. Examined bacteriologically, the exudate of one will reveal nests of bacilli which are found only in the exudate of true diphtheria, while in the other there are no bacilli, but instead the so-called staphylo- and streptococci. The first variety is highly fatal, statistics showing a mortality of almost 50 per cent., while the second, so far as danger to life is concerned, is comparatively harmless." In this latter statement he is wrong, for even these causes may produce fatal blood poisoning.

Skigo reports several cases which he met with during an epidemic of diphtheria where the tonsils were covered with disseminated spots of exudate the size of a pea, and he tells us that there was absolutely no clinical indication by which he could differentiate the cases which ran the violent course of true diphtheria, and those which took the milder course.

Morton examined 200 cases of diphtheria that had been diagnosed by that eminent clinician, Simon of Paris, and found in only 137 of these the Klebs-Löffler bacilli; 43 of the remaining 63 cases proved to be tonsillitis, 13 proved to be croup of which 12 got well without operation, 7 cases proved to be diphtheria with croup, 6 of which developed the bacilli after the operation of tracheotomy had been performed and which Morton says had been due to hospital infection.

In recent investigations made by Park, in the New York Orthopedic Hospital, where the children seem specially liable to attacks of follicular tonsillitis and enlarged tonsils, culture experiments were made and in some instances pure cultures of the typical Klebs-Löffler bacillus were found in fair abundance and in others they were scanty. Though the soil was favorable, the bacilli found were evidently not of a virulent character, and from these reports, Chappell, in the *New York Medical Record*, observes that until these causes were examined, he had supposed that Klebs-Löffler bacillus found in a sore throat meant diphtheria, whether the clinical history and evidence supported that diagnosis or not. He concludes that

at present writing it seems there are three possibilities:

1. Clinical phenomena of diphtheria without Klebs-Löffler bacilli.

2. Clinical phenomena of diphtheria with Klebs-Löffler bacilli.

3. Kelbs-Löffler bacilli without any clinical phenomena of diphtheria.

If it be true that diseases attended with the formation of the pseudo-membrane of the throat due to other causes than the Klebs-Löffler bacillus are not followed by the well-known sequelæ of diphtheria, then the term diphtheria, should not be applied to them. The term, diphtheria, has in the past been freely applied to this form, but I think it is a misnomer. The name diphtheroid, which was first applied I believe by Dr. Lester Hall of Kansas City, is much more appropriate, as it expresses the thought that the disease is like diphtheria.

It is said that there is no germ that is so variable in its virulence as the Klebs-Löffler bacillus, (but all forms of life vary in their degree of lustiness) and this may account to some extent for the difference in severity in cases of diphtheria; we are all aware of the fact that there is a great variation in the virulence of all epidemics; whether it be due to atmospheric or other causes, has not been fully established. Another element of confusion to the practical physician is the statement that the pseudo-bacillus found in diphtheria does not vary in any way microscopically from the true Klebs-Löffler bacillus. If this bacillus and others may vary so materially in their lustiness, in their ability to make their way in the world from time to time, may they not also vary in their general appearances to a like degree, and thus create confusion as regards microscopic diagnosis?

In a recent discussion, Dr. C. H. Johnston, of Grand Rapids, Mich., says he can see no good reason for considering these so-called pseudo-bacilli as other than true diphtheritic germs, which if planted upon suitable soil may give rise to the most severe forms of diphtheria.

The many conflicting facts presenting themselves to us, may, if they do not prompt us to ask ourselves pathologically, "where are we at?" at least make us hesitate in insisting upon the making of a diagnosis based only upon microscopic demonstrations. Indeed, in spite of the brilliant light which has been thrown upon the subject from the intellectual lamps of many of the best men of the profession the world over, there is reason for our not being entirely absorbed in our study of diphtheria as well as other diseases, by the microscopic and bacteriologic evidence to the exclusion of the bedside clinical evidence.

While personally I am disposed to accept the germ theory, particularly as applied to the infectious diseases, and probably to far more than have yet been discovered, yet I still believe most firmly that there are many diseased conditions dependent upon other things than germs and that clinical facts are stubborn things.

Every true physician never ceases to be a medical student, and he needs to guard himself against too readily accepting the dictum of those whom he may recognize as the masters of the profession. The views of Lawson Tait and the many other able workers of the medical world are worthy of consideration, worthy of being weighed in the balance. I have great respect for the opinion of any man who has given evidence of being an earnest, honest student in science, no matter what his views may be. Our own Dr. Wm. Johnston, one of the Nestors of the medical profession of St. Louis, one of the most indefatigable delvers in the field of literature, medical and general, when he antagonizes the germ theory of disease, we must remember is in very good company and his views are worthy of our most profound attention. At the same time the younger workers in the scientific vineyard who spend most of their time looking through the small end of a microscope and into the depths of test-tubes, mingling with laboratorial outfits, should have a care lest they develop an intellectual myopia which will preclude their appreciation of the importance of bedside observation, of clinical evidence. They should each and every one remember that bacteriology is not all of the science of medicine, and that the bulk of medicine is art rather than science, and other things being equal, the careful student of human nature, the close observer and the energetic worker in the sick room, after years of experience, is often far more competent to make a diagnosis of a given disease by clinical evidence alone than they, with their microscopes and culture tubes, without such knowledge and experience. Who of us who have listened to the able and forceful words of a venerable teacher of surgery in St. Louis, his teachings based upon knowledge gained from reading not only books but the symptoms of disease, would not as soon accept his dictum with reference to a tumor, its benignancy or malignancy, its necessity for removal, as the most expert microscopic opinion taken alone.

Any physician of experience worthy of the name, can make a diagnosis of pulmonary tuberculosis on the clinical evidence alone, and bring the microscope to his aid only for confirmatory purposes. But the true physician is ever receptive and unprejudiced whether in the sick-room or the laboratory—he who knows it all generally knows very little.

Like syphilis, diphtheria is probably primarily local, as it can be inoculated upon a denuded surface, but like syphilis, general in its effects, it so promptly affects the system at large that the removal of the infected point by the cauterization of the membrane in the one case or the excision of the primary chancre in the other, will not prevent constitutional systemic poisoning. Time was, when in an empirical way, physicians immediately attacked these exudates in the air passages with violent caustics, often doing greater injury to the surrounding parts than to the invading membrane.

As syphilis has been in modern times greatly modified and its asperities softened by the recognition of the importance of local cleanliness and the securement of favorable constitutional conditions, so I believe may diphtheria. A suitable soil with depressed constitutional conditions, in other words a dirty suppurating neglected angina (as in scarlet fever, acute tonsillitis or quinsy) with perverted secretions throughout the alimentary canal, an already existing blood poisoning produced by the numerous streptococci and staphylococci present in the faucial field, presents conditions favorable to the development of the most brutal and lusty Klebs-Löffler bacilli imaginable.

One should hesitate long before relinquishing many of the valuable measures which have stood the test of time, and accepting the newer therapeutic sugges-

tions, even including that of Behring, for he undoubtedly originated and developed the antitoxin treatment of diphtheria. Roux, who is a skilled bacteriologist, and presented remarkable results in a definite manner at the International Congress of Hygiene at Buda-Pesth last summer, freely accords the credit of this discovery to Behring. The literature that has been presented during the past few months in favor of the blood serum therapy as applied to diphtheria, is enormous, and no candid careful observer can ignore the fact that the great bulk of it is favorable.

Nearly a hundred years ago, Edward Jenner presented to the world the original thought in the direction of treating disease in man by a product from a lower animal which had previously been acted upon by the same disease. In other words, Jenner's application of vaccination for smallpox was the first move in the direction of the blood serum therapy, for we have no reason to doubt that vaccinia on the udder of the cow is probably primarily the result of smallpox introduced into the same animal. It is true that the workers in this field are now moving along scientific lines and not empirically as did Jenner, and yet he stands an example to all scientists whether they be bacteriologists or bedside physicians, illustrating the thought that in the study of symptoms, the grasping of facts, the application of them, clinical work is after all one of the best means of demonstration in the hands of the physician. It will be remembered, too, that Jenner did not publish to the world his work until he had elaborated it, perfected it, and extended it over a period of twenty-five years.

The best report of the antitoxin treatment of diphtheria has been through the United States Marine-Hospital Service. Surgeon-General Walter Wyman having delegated Surgeon J. J. Kinyoun, a skilled bacteriologist, to visit the Pasteur Institute and study thoroughly the work of Prof. E. M. Roux, he presents his official report in the weekly abstract published by the Marine-Hospital Service under date of Oct. 20, 1894, and it is indeed the most succinct and reliable article upon this subject that has yet appeared. Too great credit can not be given Surgeon-General Wyman and his subordinate, Dr. Kinyoun, for the report. The essence of the conclusions made by Dr. Kinyoun are contained in the following: "The results obtained by Professor Roux in the treatment of cases of diphtheria are so astounding, that one is almost compelled to ask one's self, 'Is this possible?' but when the methods are known and the array of statistics are given, there can hardly remain a trace of doubt. The future possibilities in this direction can not be over-estimated as we have in the serum the almost absolute preventive of epidemics of diphtheria."

The great Virchow was for a time opposed to this method, but in a recent meeting of the Berlin Medical Society, he publicly announced that he had to yield to the brute force of unanswerable facts. A full opportunity was furnished for the comparison of results in a large number of cases in Berlin, when treated with and without the blood serum. Hausman, Virchow's assistant, still opposes the blood serum, but as yet there has appeared no presentment of facts upon which to base his opposition; at least it has escaped my observation. The reports from London, France, Berlin and upon this side of the water, are in the affirmative. The government of France has given to Roux its highest honors in recognition of his work.

And now what shall be said of the present general application of the blood serum therapy? First of all, the remedy is enormously expensive. The animal best adapted for its development is the horse, and the time required is not less than six months. This practically places it beyond the reach of the great masses. If the serum treatment is to become general, then comes the important question, and it is a difficult one, what arrangements are to be made for protecting the community under sufficient and proper guarantee with the material for this treatment? Surely the same arguments would apply in favor of this prophylactic measure (for such it is, as well as a remedial agent) being placed under the control of local boards of health, the same as in vaccination for smallpox. It is to be supposed that health boards have definite knowledge and supervision of the vaccine farms which furnish vaccine virus to the respective communities, and they should have similar supervision over the laboratories where the blood serum is developed. The health boards should know that properly healthy animals are secured, those of proper age, and that the proper sanitary and antiseptic precautions are exercised in the establishment. Even granting that the blood serum therapy has proved its case, until it is available, and even after, we must not lose sight of other remedies which have after long service proved of value, for there can be no doubt that considering the fact that the antitoxin antagonizes only the Klebs-Löffler bacillus and not the streptococcus and staphylococcus and other pyogenic microörganisms, we are never safe in ignoring our old therapeutic friends in favor of the exclusive use of the new. Reviewing the amount of confusion that exists even among bacteriologists regarding the definite cause of diphtheria, and the different kinds of diphtheria, and the like confusion and uncertainty pertaining to the blood serum therapy, and our inability to make it generally applicable to mixed infections, we are justified in the exercise of the extremest caution in its application.

Diphtheria poison is tenacious of life and may be transported indefinite distances. The disease is always more or less present in crowded communities, possibly inhabiting permanently the sewerage systems of cities. Laboratorically demonstrated, the Klebs-Löffler bacillus is admitted to be found in seemingly healthy mouths frequently. A large number of the children in every community at certain seasons of the year through the medium of follicular tonsillitis, enlarged tonsils and catarrhal disturbances of the air passages, and scarlet fever angina, present themselves as standing invitations to diphtheria. A bacteriologic demonstration of true diphtheria requires twenty-four or forty-eight hours. Remembering all these facts, every case of sore throat should be isolated and treated as a suspect. While in no case acting as an alarmist, the physician should be a guarder and a protector of his patients, and should from the beginning inform the family of the possibilities of any sore throat developing into a diphtheria.

The foregoing being true in every case of sore throat, the treatment from the first should be antagonistic to diphtheria, locally and constitutionally, no matter how benign it may appear, no matter whether the Klebs-Löffler bacillus be suspected or discovered. Every case of sore throat should be treated in a cleanly way and every hygienic rule should be observed. The ideal treatment for tonsillitis, the an-

gina of scarlet fever and la grippe, which may be classed under the head of suspects, is a favorable preliminary treatment for any case of diphtheria, and this is briefly, a prompt purging of the patient, emptying the intestinal canal for future service as a food tract, the administration of local applications which serve as soothers and cleaners of the disturbed mucous membranes and are as nearly germicides as can be made. Under this head comes hydrozone and pyrozone, which are definite strengths of peroxid of hydrogen, and if too irritating may be diluted one-half. This application should be followed by Listerine, Pasteurine or Katharmon, applied preferably with a hard rubber syringe, the nozzle of the same guarded by a soft piece of rubber tubing two or three inches long,to protect the throat from being wounded. The keeping of the nasal passages well open by the means of liquid albolene (5 grains of carbolic acid to each ounce) protects the mucous surfaces and renders the infection at these points less probable. The internal administration (from the beginning) of the benzoate of soda, in doses ranging from 5 to 20 grains, well diluted with plain water every one or two hours, according to the age of the patient, serves as a stimulator of secretions and is the best remedy for prompt reduction of a benign inflammation of the tonsils, it being equally valuable in the removal of exudations. A dry engorged condition of the mucous membranes with all secretions presenting a tenacity and a disposition to stick to the surfaces, is soon changed under the saturating doses of the benzoate of soda, into a loosening of all exudations and a moist condition of all the surfaces. A flow of mucous from the parts is stimulated and exosmosis rather than endosmosis is encouraged. Salkowski in 1879 announced that saturated solutions of the benzoate of soda rendered the diphtheria membrane, if bathed in them, absolutely inert, so that the remedy is more or less locally antiseptic. In addition to the remedy suggested, the bichlorid of mercury should be given from the beginning, starting with 1-50 of a grain or even 1-32 well diluted, to a child of 2 years, and increasing in proportion to the age, for at least twenty-four hours, the same dose to be continued every two or three hours thereafter as long as the conditions call for it, unless too free a catharsis be produced. Clinical facts deduced by others, as well as those coming under my own observation, are absolutely convincing that the internal use of the bichlorid of mercury is antagonistic to the toxic effect of the diphtheria poison, the same as it is to the Lustgarten germ of syphilis (if there be one) and to all other germs as well, including even tuberculosis when given discreetly, and it is a local antiseptic.

Our forefathers were not far wrong when they gave calomel and other forms of mercury in reasonable doses to their cases of diphtheria, typhoid fever and cholera; but mercury is not the only remedy which has for centuries been given empirically and yet proved to be scientifically correct. We have been giving opium for two thousand years as a reliever of pain, and yet we do not know how it acts; we only know that it does.

The thoughtful physician should never lose sight in the management of his throat cases, of feeding, and indeed within twenty-four or forty-eight hours, having placed the alimentary canal in the best possible shape for the digestion and assimilation of food, the nutrition, in a form to be readily digested (use it predigested if necessary) and assimilated in proper quantities at proper times should be furnished, for after all, good well fed blood can repel successfully most of the bacilli and their toxins. Stimulation should be ever kept in mind but not applied too soon. When we recall the demoralization of the digestive tract and the nerve centers produced by the excessive use of alcohol in adults, we should have a care in our administration of alcoholic stimulants to delicate children. I have found a pine-apple peptic wine known as Zumo-Anana of great service as a stimulant. Remedies, either local or constitutional, should not be given so frequently or be of so irritating a character as to interfere with the digestive function or with the proper amount of rest on the part of the patient.

To epitomize, then, whether the blood serum therapy be applied or not, our treatment of our diphtheria cases should include a full regard for:

Elimination, the keeping open of the secretory and excretory system of glands.

Disinfection, local and general, of the attacked surfaces, the patient and his environment, should be applied, even though the case be only a suspect and present none of the evidences of the more infectious disease.

Nutrition of a character to be most promptly utilized, and nothing is better in this direction than peptonized milk, and milk has the advantage in this form of being soothing to the inflamed surfaces of the throat. Ice cream made of good materials is often gratefully received by the patient and is quite digestible.

Stimulation, but not until it is required, for he who crosses his bridges before he gets to them makes a mistake. Oats are better for the thorough-bred roadster than the whip, unless the latter be used upon the animal when in the middle of a bridge which is breaking down; and then the whip serves well to spur the flagging energies, and so with stimulation in disease.

Tranquillization both of body and mind should be the rule from the beginning, and to this end the victim should never be given the diagnosis of his case, and no application, no remedy, nothing should be permitted to interfere with a full amount of sleep within the twenty-four hours. If necessary, sedatives to secure rest should be given and they should be given for an effect. Small doses of a sedative often excite, whereas large ones result happily.

Rest is one of the sweetest words in our language, and in the management of no disease is this more true than in diphtheria.

In closing, let me insist upon the thought that in the majority of cases the microscope is only valuable for the confirmation of the diagnosis, though exceptionally it is essential to the making of a diagnosis, and whether we get our own consent to the application of the blood serum therapy or not, let us never lose sight of the proper toilet of the throat, the proper use of our accepted and well tried remedies in addition.

The child with sore throat, as well as the other members of the family, should be given the benefit of the doubt, and isolated and treated always with the possibilities of diphtheria in mind.

The Forty-sixth Annual Session of the AMERICAN MEDICAL ASSOCIATION will be held in Baltimore, Md., on Tuesday, Wednesday, Thursday and Friday, May 7, 8, 9 and 10, commencing on Tuesday, at 10 A.M.

TABETIC FOOT WITH PERFORATING ULCER. (MAL PERFORANT DU PIED.)

Read before the Chicago Pathological Society, Dec. 10, 1894.

BY HAROLD N. MOYER, M.D.
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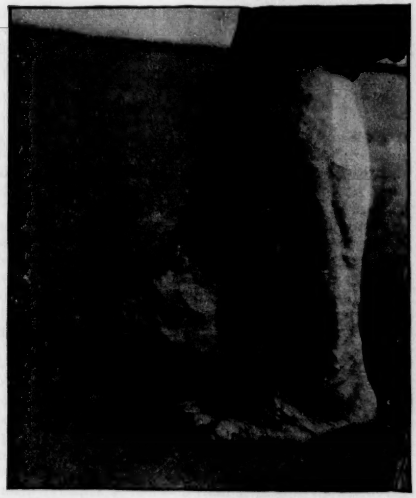
Male, 48 years of age, of previous good health and vigorous constitution, a sailor by occupation, contracted syphilis fourteen years ago. Two years later an ulcer began on the right toe; at first there was some swelling of the epidermis on the inner aspect, and a bleb formed. This gave way and an ulcer remained that gradually deepened until it extended in a funnel-shaped excavation to the bone. After this the toe was amputated. The following winter the third toe on the right foot became diseased and was removed. From that time on the patient was free from all disturbance about the joints, with the exception of the gradually developing deformities,

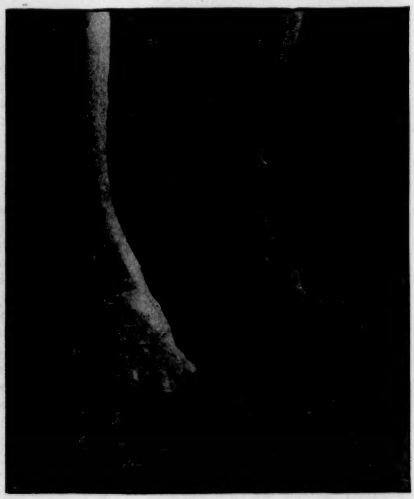


until the winter of 1893 and 1894, twelve years after the onset of the malady in the right foot, when the great toe of the left foot became similarly affected necessitating amputation.

In January of that winter he began to have pain in his stomach, his gait became uncertain, and there was a numb sensation from the knees down. Since that time he has been unable to work. He has now well-developed tabes, marked incoördination, loss of the light reflex, gastric crises, but no lightning pains. The feet show the loss of toes that have been amputated and also a clubbed condition of the second toe on right foot where there is a large callus and no nail. The second toe of the left foot is gangrenous. The whole foot is deformed and distorted. There is a thickening of the metatarsal bones, and disease and deformity of the bones and joints which make up the arch of the foot. An examination of the accompanying photographs will show that the medio-tarsal joint is the most involved. Not only are the bones eroded and displaced, but there is more or less thickening of the cartilaginous and osseous structures forming the arch of the foot; so that the foot is humped much as it appears in dislocations of the medio-tarsal joint, but unlike the latter condition the foot is not in an equinus position and the plantar surface can be brought to a right angle with the axis of the leg.

There are two principal varieties of tabetic arthropathy of the foot; in one we have the medio-tarsal joint involved, with a projection of the arch of the foot; in the other the disease seems to expend its force largely upon the ankle joint and the articulations between the astragalus and os calcis. In these cases the foot is in extreme extension; in one figured by Charcot there is a dislocation of the ankle and the foot forms a direct continuation of the long axis of the leg.

To Charcot and Féré [1] we are indebted for the term tabetic foot. In 1883 they reported two cases of this



disease and priority is commonly accorded them. Page,[2] the previous year, had described a case of tabetic arthropathy in which the tarsal bones of both feet were involved. In 1884 Féré [3] reported an additional case. Since that time cases have been reported by Boyer,[4] Joffroy,[5] Chauffard,[6] Longuet,[7] Féréol,[8] Kramer,[9] Chipault,[10] Audocond [11] and Klemin.[12]

In some of the cases, perforating ulcer was associated with the deformity of the foot such as we have in this case, but they are not necessarily associated, as each condition may occur separately and apart from the other.

So far as I am aware, Bernhardt [13] reported the first case of perforating ulcer in connection with tabes. This was followed by cases from the pens of Pepper,[14] Hinze [15] and Audocond.[16] Hinze,[17] in a later communication, collected twenty cases from the literature and two additional ones occurring in his own practice, in all twenty-two; of these nineteen

were men and three women. In eight cases the ulcer preceded outbreaks of tabetic symptoms and in ten they followed. In three cases the ataxia and ulcer appeared at the same time, while in one the fact could not be ascertained. The longest time noted by Hinze in which the ulcer preceded the tabes was ten years. It will be seen that in the case under consideration this length has been exceeded, some twelve years having intervened between the appearance of the perforating ulcer and the first symptom of tabes.

A number of different theories have been propounded to account for the trophic changes in tabes. Charcot believes it to be due to an atrophy of the cells in the anterior horns of the cord, while Virchow simply referred it to lowered nutrition due to perverted nerve influence. Oppenheim and Siemerling demonstrated a change in the peripheral nerves, but it is apparent that such conditions may be only secondary. Volkmann pointed out the relation of traumatism and analgesia in these cases. Undoubtedly, in advanced forms, these factors play an important rôle. It does not account, however, for those cases in which the joint troubles precede by months or even years the earliest tabetic symptoms. As a matter of fact, our knowledge of the trophic centers of the nervous system is yet too slight to throw much light on the pathology of these cases.

An interesting case of perforation of the aortic valves was reported by Teissier [18] in a tabetic. The case presented a close resemblance to the ordinary perforating ulcer of the foot, and was thought by him to have an identical pathology.

Terrillon [19] has reported a unique case of multiple perforating ulcers of the hands in a case of tabes of syphilitic origin.

[1] Arch. de Neurol, VI, 18, p. 305, 1883.
[2] Tr. Clin. Soc. Lond., 1882, XVI, p. 158.
[3] Revue de Medicine, IV, p. 473, 1884.
[4] Rev. de Med., I, V, p. 487, 1884.
[5] Gaz. hebd. de Med 2, 5, XXII, p. 408, 1885.
[6] Bull. et Mem. Soc. Med. d. hop., 1885.
[7] Union Med. 3 S., XLI, p. 493, 1886.
[8] St. Petersb. Med. Wochenchr., 1886, N. F. III, p. 243.
[9] Prag. Med. Wochenschr., 1887, XII, p. 283.
[10] Gaz. d. Hôp., 1889, LXII, p. 265.
[11] Rev. Med. de la Suisse, 1890, X, p. 581.
[12] St. Petersb. Med. Wochenschr., 1892, X, p. 269.
[13] Centralb. fur Chir., 1881, VIII, p. 669.
[14] Tr. Path. Soc. London, 1884, XXXVI, p. 660.
[15] St. Petersb. Med. Wochnschr., 1886, III, p. 243.
[16] Soc. cit.
[17] Centralb. f. Nervenheil. u. Psych. 1891, II, p. 97.
[18] Teissier. Lyon Med. LV 1887, p. 49.
[19] Bull. et. Mem. Soc. de Chir. de Paris, 1885, N. S., XI, p. 408.

APPENDICITIS.

DEDUCTIONS FROM TWO HUNDRED AND SEVEN CASES OPERATED, WITH TABULATED REPORT.

Read before the Chicago Pathological Society, Dec. 10, 1894.

BY JOHN B. MURPHY, M.D.
CHICAGO.

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In many of the recent periodicals we find these ideas expressed: "The pendulum of operative appendicitis is now swinging in the reverse direction." "The frequency of operation on the appendix is going through the same course as did removal of the uterine appendages." The frequency of operation has not been irrationally swung, nor carried to its present position so-called excessive, but has found the strongest opposition from the very onset and is only now by the sheer force of pathologic necessities approaching its proper position in frequency of performance. The expressions quoted are used almost exclusively by men who have not yet realized the pathologic conditions nor the true importance of early operation. Their intellectual vision is still in the shadow of the "grape seed," "cherry pit," "catarrhal inflammation," and "rheumatism" of the appendix. They have not the slightest idea of the destructive effect of an infection of the appendix. They do not realize that with an infection, the appendix may become completely gangrenous, may perforate or may produce a fatal peritonitis all in a short period of time (forty-eight hours), from the initial symptom. Again, it is said by the same class of men: "I am opposed to the indiscriminate removal of ovaries and appendices when they are not seriously diseased." So is every rational operator and this idiotic expression should not be tolerated in medical societies without appropriately stamping its author.

There has been no controversy in the history of medicine in which the struggle has been so intense between the surgeon and the physician as on that of appendicitis. Both parties have been honest in their convictions and both equally positive that they are right.

We naturally seek an explanation for this diversity of opinion as well as action, and the explanation is not difficult to discern. Differences of opinion as to the clinical course and probable results with operative and non-operative treatment have been almost entirely due to erroneous notions of the pathologic conditions. Up to five years ago we had on the pathology of appendicitis practically no other teaching but that of the post-mortem table; that has to-day been almost entirely superseded by the teaching of the operating table. To-day we observe on the operating table pathologic changes almost from the moment of their beginning until the destruction of the parts concerned is complete; whereas formerly we made deductions, and these very erroneous ones, as to conditions that existed before the pathologic changes ensued which produced death.

From results found post-mortem we inferred the cause and course, and here was the source of error; to-day we observe the disease in the various stages of its progress from its inception to the final result. We are therefore preëminently qualified to arrive at a correct conclusion, inasmuch as our opportunities are so much greater for observing pathologic changes as they progress.

Now, on what points have the surgeon and the physician differed and what has led to the diversity of opinion?

From 1886 to 1888, when Gaston and Kraft wrote their excellent monographs on appendicitis, it was the prevalent opinion of the profession all over the world that the vast majority of diseases in the right sacro-iliac region were due to cecitis, an inflammation of the cecum or its surrounding tissues as a result of disease of that viscus, and it was variously known as typhlitis, perityphlitis and cecitis. Then, after these elucidations, the physicians gradually yielded point after point until finally, to-day, it is agreed that all except 2 per cent. of the inflammatory pathologic lesions about the caput coli are due to primary lesions of the appendix.

We may now regard the first point as practically settled; the next argument advanced on theoretical

considerations was that the appendix in inflammatory infections becomes swollen, and relieves itself by the discharge of its inflammatory products through its normal opening into the intestine, thus effecting a cure.

What have we learned from observations at the operating table? That in inflammatory lesions of the appendix, the canal is rarely relieved of its inflammatory products in the way suggested, but is relieved by a necrosis of its wall and perforation. This is followed by the formation of an abscess and a subsequent necrosis of the attached wall of the viscus to which it is adherent, the contents of the abscess escaping into the intestine.

The next contest was over the presence or absence of pus outside of the appendix, in the majority of acute cases. Observation in operations has shown us that in the acute stage, in 94 per cent. of the cases, pus is found outside of the appendix; that the existence of pus outside of the appendix does not necessitate a perforation of that organ for its production. That an infection of the peritoneum and the formation of a peri-appendicial abscess may occur with an internal ulceration of the appendix and no perforation, as I have shown by cases reported in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION,[1] March 3, 24, 1894.

While the profession was not prepared to believe that pus was present in the form of a circumscribed peri-appendicial abscess in practically all of the cases of acute appendicitis, it had been acknowledged for many years that in some cases abscesses occurred around the caput coli, which emptied into the intestinal tract and the patient recovered. We know now that this is the course in the very great majority (about 82 per cent.) of cases that recover without operation.

The last and final questions, and the ones on which the controversy is still spirited, are: *a*, the pathologic changes produced by perforation of the appendix into the peritoneal cavity; *b*, the likelihood of that perforation, and also perforation of the circumscribed abscesses about it, into the peritoneal cavity; *c*, the immediate and remote symptomatic and physical manifestations of the latter; *d*, the ultimate result of such rupture; and *e*, the danger of infection of the peritoneum from an endo-appendicitis without perforation.

The pathologic changes produced depend: 1, on the character of the material admitted into the peritoneal cavity, *i. e.*, whether the contents of the appendix or abscess consist of, *a*, pus or *débris* in which the staphylococcus predominates; *b*, whether the streptococcus predominates; *c*, whether the bacillus coli communis exists in its virulent or inert condition; and *d*, whether the pus, in which any or all of these may have existed, has become innocuous; 2, the quantity of material admitted at one time into the peritoneal cavity; 3, on the condition of the peritoneum at the time of admission of pus.

I have observed in patients, and demonstrated experimentally, that pus in which the staphylococcus and the inert bacillus coli communis predominated, could be free in the peritoneal cavity for a long period of time and produce but very slight changes in the peritoneum, *i. e.*, that the intestine may be bathed in pus of this character for days without excoriating the peritoneum. I have observed a pint of pus of this character in the peritoneum of a patient where the history showed conclusively that it must have been present for five days, and upon opening the peritoneal cavity the normal gloss of the peritoneum of the bowel was still maintained. I have taken this pus and produced cultures with it which demonstrated its character, and injected one drachm of the pus as removed from the peritoneal cavity into the peritoneal cavity of animals, both with and without mechanical abrasion of the peritoneum, without producing any symptoms, and no pathologic lesions were found on making an autopsy.

In cases of general suppurative peritonitis, as a result of appendicitis, that have been under my observation, in which the normal glistening appearance of the peritoneum was present at the time of operation, the patients recovered, and inoculations of the pus into the peritoneal cavity of animals produced no symptoms or lesions. When I find that the pus has not abraded the peritoneum, even though the surface has been covered by it for a length of time, I consider the case a favorable one.

Note how this contrasts with the appearance in the abdomen where the streptococcus predominates. Here we find, within a short time after the rupture into the peritoneal cavity, the peritoneum in contact with the infectious material is entirely denuded of its endothelium, resembling the condition produced by a cantharides blister. The quantity of pus is always small, rarely exceeding a few drachms, with here and there flakes of lymph. The bowel is distended and paralyzed; peristalsis has ceased. Inoculations with this pus produced the same condition; the red and angry appearance of the intestine I now recognize as a signal of the gravest importance, as the majority of my cases in which this condition was present terminated fatally.

The septic conditions of the bacillus coli communis produced about the same physical manifestations as that of the streptococcus. The quantity of material discharged into the peritoneal cavity is of great significance; if it be small the intestines and omentum rapidly circumscribe it and protect the general peritoneal cavity from invasion. If it be large, and if it be irritating and poisonous, it may abrade the peritoneum of its endothelium as boiling water would, quickly, and be followed by a rapid absorption, causing death in a few hours. I have had only one case of this class in which an abscess of considerable size ruptured into the peritoneal cavity; within two hours the extreme symptoms of shock were present and in twelve hours the patient succumbed. If a large quantity of pus of a low septic character be admitted into the peritoneal cavity, it may remain in that cavity for days and produce but slight changes; finally, from some cause, this material which had been innocuous, suddenly produces grave conditions and symptoms.

It is a matter of deep-rooted belief that a peritoneum that has been irritated repeatedly by the presence of a tumor, by the close proximity of an accumulation of infectious material finally attains an increased resistance against infection, *i. e.*, the peritoneum of a patient who has suffered from the presence of a large and movable tumor will tolerate much

[1] Dr. Fowler also made the same observation and in the *Annals of Surgery*, January, 1894, expresses himself as follows: "From the first appearance of an endo-appendicitis, channels of infection are open which may lead to the occurrence of any one or all of the forms of septic peritonitis without the occurrence of perforation, formation of adhesions, or rupture of a sero-purulent collection of an abscess cavity."

more manipulation than a perfectly normal peritoneum, and that the peritoneum in the neighborhood of an old circumscribed abscess is more difficult to infect than a healthy peritoneum.

There has been a great difference of opinion as to the symptoms of appendicitis and the relation of the symptoms to the pathologic condition within. This diversity will continue until our power of differential diagnosis is very much increased. From a train of symptoms and signs in the early stage it is impossible to say just what is the exact pathologic condition. We can say, however, that it is a disease of the appendix in some stage of its development.

The symptoms of appendicitis are: 1, a sudden pain in the abdomen; 2, shortly followed by nausea and perhaps vomiting; 3, local tenderness over the site of the appendix, and most frequently in the right iliac region; 4, elevation of temperature.

These symptoms occurring in this order without a previous history of genito-urinary infection, lesions of the gall tracts or Pott's disease, indicate appendicitis with almost uniform regularity. They do not indicate that the appendix is gangrenous or that it is a simple catarrhal appendicitis. They do not indicate whether the appendix has perforated or has not perforated; nor whether the cause is an infection with the staphylococcus, streptococcus, bacillus coli communis or the presence of a fecal stone or a foreign body. They do not indicate whether it is stenosis of the appendix or an appendicitis obliterans but merely that it is an appendicitis, a disease of the appendix.

The physical manifestations, the presence or absence of induration, tumefaction, edema of the wall, tympanites, etc., aid in the differentiation of the various pathologic conditions present in the more advanced stage, but all of these are absent or comparatively worthless in the early stage.

The etiology, which was for a long time a subject of contention, is now practically agreed upon. It was very difficult to eradicate from the professional mind the deep-rooted erroneous belief that in a great majority of cases, appendicitis was due to foreign bodies admitted into and retained in the appendix, as grape stones, cherry stones, fragments of bone. We had four cases of foreign body and 38 per cent. of fecal stone. To indicate the causes of appendicitis, I will use the same classification employed in my article of March 3, 1893:

1. Simple pus infection, producing the catarrhal variety.

2. Extensive infection by bacillus coli communis or pyogenic microbes, producing gangrene of a greater or less portion of the appendix.

3. Pressure atrophy with infection of the appendix: *a*, by fecal concrement; and *b*, by foreign bodies.

4. Retention accumulations: *a*, from cicatricial contractions, stenosis and obliteration; and *b*, from occlusion by enterolith or foreign body.

From the reports of autopsies collected, I find that in 70 per cent. of the cases there was a perforation of the appendix. Of my own cases in which the appendix was removed there was about 80 per cent. perforated. Simple catarrhal primary appendicitis, if it exists, is rarely brought to the attention of the physician and still less frequently to that of the surgeon. Of 207 cases reported we had but one of this variety. A catarrhal inflammation where the more serious form of appendicitis had previously existed is not uncommon.

The question of greatest practical importance to the surgeon and physician is the diagnosis; can we determine when an appendicitis is present, and can we determine the pathologic conditions that exist in the abdomen at any given time in the progress of the disease? To the former we must with positiveness answer in the affirmative; to the latter an equally forcible negative must be given, that is, we can say from the symptoms that a lesion of the appendix exists but we can not say, in most cases, how extensive, how dangerous and how far-reaching the effects of that appendicitis may be, and still less can we say in any given case how soon the life of the patient may be greatly jeopardized by the disease which at the moment has apparently no grave symptoms.

If we were able to determine in the early stage from the symptoms, physical signs or clinical history of a given case that it was going to take a favorable or unfavorable course, we could regulate our treatment accordingly. Unfortunately, there are no symptoms present in the dangerous cases, premonitory of their fatal termination, until the patient has passed beyond the stage where an operation offers reasonable hope for a recovery.

The question to be answered is, When should we operate?

The so-called conservative answers: "Operate on the collapsed cases; the cases that present symptoms of fulminating peritonitis; the cases that are taking an unfavorable course; the cases that appear to be progressing rapidly to destruction under medical treatment."

The surgeon must take a positive stand and answer, No, to each of these rules. It is admitted that 50 per cent. of the fatal cases terminate before the end of the sixth day, many on the fourth and a smaller number on the second.

The surgeons who wait till the sixth day must therefore expect to have a mortality of 50 per cent. of all the cases that would die without operation. I believe the proper position for the true, earnest and advanced medical man is expressed by the eminently scientific and truly conservative physician, Dr. Norman Bridge, in the following words: "Appendicitis is one of the most frequent and dangerous of the inflammatory diseases in or about the peritoneal cavity. We do not know the line between proper medical treatment and the demand for surgical interference, and rather despair of finding it. The medical man is practically powerless to control the destiny of the patient. It is always a surgical disease and the mortality should be materially lessened by skillful surgical treatment."[2] Would you delay operation in a case that is progressing favorably? By that I mean a case in which the temperature is not above 99 degrees, the pulse not above 80, the expression good, the abdomen presenting no alarming symptoms. No; I have seen cases of this class go to the third, fourth and fifth day with all of the most favorable symptoms that could well be imagined and on the sixth day die. From what? From a suppurative peritonitis that had existed all that time, as shown by the pathologic changes found in the peritoneum.

We have no sign, symptom or combination of signs and symptoms which indicate with any degree of certainty, suppurative peritonitis. It may exist and the free

[2] Prof. Wm. E. Quine, whose name is synonymous with rational conservatism has said: "I am convinced that early operation is the most scientific treatment for appendicitis with our present knowledge of the pathologic condition."

peritoneal cavity contain drams of pus with the patient about town as the following case illustrates. The case occurred in the practice of Dr. Jas. G. Berry:

Patient, G. F., aged 19, weighed 220 pounds. On the morning of September 8, after breakfast, was attacked with a severe pain in abdomen, shortly followed by vomiting, and the pain and discomfort were sufficient throughout the day to prevent him from attending to his work. He remained about the same during the night, and the following morning, at 10 o'clock, twenty-six hours after the onset of pain, he walked a couple of blocks to the drug store and consulted the druggist concerning his trouble, who advised him to see a doctor, and he was seen by Dr. Berry at 3 o'clock; diagnosis of appendicitis made; his pulse when seen by Dr. Berry was 140 and temperature 102 degrees; no tympanites, increased local tenderness over the region of the appendix, peristalsis absent, patient's countenance good and expressed himself as feeling tolerably comfortable. At 4 o'clock, assisted by Drs. Berry and McQuaig, I did a laparotomy. On opening the peritoneum, pus flowed out; there were no adhesions whatever between the intestines; the appendix was free; a fecal stone protruded from an opening in the side of appendix, where it had produced a pressure atrophy perforation; appendix amputated; abdominal cavity sponged; pus found down in the pelvis; gauze drained. The normal gloss of the intestine was not disturbed in the least by presence of the pus and the surface was not even red. Patient made an uninterrupted recovery. It will be noticed that the operation was performed thirty-three hours after the onset of symptoms and but a few hours after the patient had been walking about in the street with a suppurative peritonitis. What would have been his condition if the operation had been delayed twenty-four or forty-eight hours? The answer is self-evident.

A retention appendicitis, on the other hand, may produce a temperature of 105 degrees or even greater, enormous tympanites and pulse 140, an anxious facial expression and all of the so-called classical symptoms of a peritonitis, and the peritoneal cavity be free from infection. (See report of case which occurred in practice of Dr. E. W. Lee, JOURNAL OF AMERICAN MEDICAL ASSOCIATION, March 3, 1894. These are extreme pictures, but they do occur.

When should we operate? As we are unable from the signs and symptoms to determine the exact pathologic condition, are we justified in allowing the probability of fatal conditions to continue for such a period of time without such action as would place the patient beyond the possibility of rescue even by operative procedure? No; until such time as the physician is able to determine the exact pathologic condition and danger in the individual case, and indeed we must now consider that time far distant, he is not justified at the peril of the patient's life in restraining the surgeon from acting.

It must be conceded by all, that an operative procedure, in competent hands, is in itself one involving very little risk, while the continuation of the pathologic processes in many cases greatly jeopardizes the life of the patient.

There is only one safe position to take, and that is in every case in which a diagnosis of appendicitis is made, the operation should be immediately performed. It is true that many cases can recover without operation, but we can not differentiate, in the early stages which cases are going to be favorable ones. It is further true that the earlier the operation is performed, the less the danger to the patient and the greater the ease of removing the appendix.

In a majority of cases, if an operation be performed within forty-eight hours after the onset of the symptoms, the appendix is not yet ruptured and can be removed without pus infection of the peritoneum, an advantage of which even the boldest surgeon is pleased to avail himself. The following case in the practice of Dr. Hoelscher is a beautiful illustration of this class:

Date of operation, Nov. 10, 1894. Operator, Dr. J. B. Murphy with Dr. J. H. Hoelscher. Diagnosis, appendicitis. Patient, Miss T., aged 16, was perfectly well up to 4:30 P.M., November 9, when she was attacked with pain in the abdomen, which persisted and increased in severity, compelling her to go to bed. She began to vomit at 8:30 P.M., and vomiting and pain continued through the night and up to the time of operation. At 11:30 of that night, when seen by Dr. Hoelscher, temperature was normal; the diagnosis of appendicitis was made. At 8 A.M., November 10, temperature 99.5 degrees and pulse 90; at 11 A.M., time of operation, temperature 100 degrees, pulse 110. Very tender over region of appendix; not sensitive in any other portion of the abdomen; no tympanites; peristalsis absent in close proximity to the appendix; expression good. Dr. Hoelscher is to be congratulated on his early diagnosis.

Operation: Lateral incision. Appendix covered entirely by peritoneum, adherent to the posterior surface of cecum up on to the ascending colon. End enlarged to half an inch in diameter; contained no fecal stones, but was full of pus; gangrene of mucous membrane beginning: lymph flakes in outer wall of appendix. Appendix ligated and removed without rupture; peritoneum sewed over; gauze drainage. Patient made an uneventful recovery.

In the later stage, if the surgeon is unfortunate enough to be called at the time that the peritoneum is flooded with pus and the patient collapsed, it is his duty perform the operation and give the patient the advantage of the small percentage in his favor in this forlorn condition.

The rule first, last and always should be: Operate in every case of appendicitis, promising or unpromising, at the earliest possible moment. What operation shall we perform? The incision should be made a little toward the median line from the highest point of induration, parallel to the rectus; the muscular layer should be separated with the handle of the scalpel parallel to the course of the fibers, as advised by McArthur and McBurney, and thus lessen the liability of hernia. The opening must be ample to allow the surgeon to perform the work within with ease.

In the early cases the appendix should be removed, as the adhesions are friable and permit of the appendix being readily separated and drawn into the field. The parallel band of fibers on the cecum, opposite its mesentery, can always be followed to the position of the appendix and is an infallible guide to its location.

If the non-infected portion of the peritoneal cavity be opened before the abscess is reached, *as is always desirable in the early stage*, a thorough packing of gauze should be made around the induration to prevent the gas from entering the unaffected portion of the peritoneum. This I consider of very great importance, and I make an effort to enter the peritoneal cavity just to the side of the adhesions, so as to open the unaffected portion of the peritoneal cavity before I open the abscess; in that way the adhesions may be located and the packing well placed, so as to thoroughly protect the peritoneum before the adhesions are torn.

In the later cases, that is, from the seventh day on, I consider it advisable to open directly into the abscess where adhesions to abdominal wall are present, drain the abscess, remove the fecal stone, if one be present, and make no effort to remove the appendix. The appendix in the acute cases should be simply ligated with chromicized catgut; no effort should be made to top-sew it or bury it in the cecum. Occasionally there will be a fecal fistula, but that closes in a very few days itself.

In the cases of appendicitis operated on in the intermediate stage *i.e.*, between the attacks, a cuff should be made of the peritoneum of the appendix, peeling the peritoneum back one-half inch or more; the mucous and muscular layers ligated and the cuff drawn back over the stump of mucous membrane and ligated. The pus should be carefully sponged out of the cavity and no water or disinfecting solutions used; do not waterlog the peritoneum as it is sufficiently taxed in taking care of the pus without this additional labor. A glass and gauze drain should both be used in all cases in which pus is present at the time of operation or in which there has been a recent attack of appendicitis. The drain can be removed in eight or ten days as the cavity fills up from the bottom.

This, in short, is an outline of the procedure I follow. All of the minor details can not be mentioned here. There is no operation in the peritoneal cavity where the patient's life is so completely in the hands of the operator, where the errors of doing too much or too little work would be so likely to result fatally as in the operation for appendicitis, with its multiform and complicated pathologic conditions. The results depend in a very great degree on the extent of the invasion, and the latter upon the period of time that has elapsed since the onset. In speaking of results, I do not mean the results in recurring appendicitis, the simplest and least dangerous variety of all; I mean the results in all classes of cases, from the general suppurative peritonitis as a sequence of appendicitis, to the simplest catarrhal variety.

There is a growing tendency in the profession to shirk the responsibility of operating where the dangers are great, *i.e.*, to defer operation on the most dangerous cases and advocate operation on the obliterated or stenosing recurrent varieties in which there is the least danger to the life of the patient from the disease. We must not swerve from our obligations to our patients, but make every effort to rescue them, regardless of the praise or condemnation bestowed upon us.

In reporting the cases, it is the duty of every operator to classify or mention in detail the important or common symptoms of each individual case in a tabulated form and give an abstract of the history and pathologic conditions, that the analytical mind in reviewing the results obtained by the individual operators may be able to explain the cause of their success or failure when the operator himself is not. Therefore it is the duty of every surgeon, in writing on this subject, to give sufficient details of his cases to enable the reader to judge why they were of the grave or mild variety; whether they were all cases of recurrent, simple, adhesive appendicitis, or whether many of them were of the gangrenous, perforative and malignantly infectious variety with the peritoneum extensively involved.

(*To be continued.*)

A MEDICINE MAN SLAIN.—A medicine man of the tribe of Puyallup Indians, named Jim Bonchette, was killed by Jerry Dominic, another Indian belonging to the Muckleshoot Reservation, in the State of Washington, for the reason that the former had failed to cure the sickness of three of the children of the latter.

ORIGINAL INVESTIGATIONS ON THE NATURAL HISTORY, (SYMPTOMS AND PATHOLOGY) OF YELLOW FEVER. 1854–1894.

BY JOSEPH JONES, M.D., LL.D.
NEW ORLEANS, LA.

(*Continued from page 404.*)

CHAPTER VII.

MICROSCOPIC AND CHEMIC EXAMINATION OF BLOOD.

The color of the venous blood was purplish, between that of arterial and venous blood. When a drop of blood was allowed to fall upon a sheet of white bibulous paper, a central bright red spot remained with a surrounding bright golden aureole of serum, which spread around the central corpuscles by capillary action. The blood coagulated very slowly and formed a large loose coagulum, or clot, which contracted slowly and imperfectly. Thus in the 1,000 grain specific gravity bottle the coagulum filled the whole bottle, and from this amount of blood not more than 150 grains of golden-colored serum could be collected at the end of forty-eight hours. The blood corpuscles tended to rapid dissolution in the serum, and upon long standing the serum changed from this cause to a bright red. The reaction of the blood was most carefully determined as it flowed from the veins, and was found to be slightly alkalin, as is usual in healthy blood. I regarded this observation with interest as in several cases, in which I had abstracted blood from the cavities of the heart, after death, it gave a decided acid reaction; but the present observation would seem to show, that the acid reaction was due to post-mortem changes. Immediately after its abstraction, the blood was subjected to a careful and rigid microscopic examination. Under a magnifying power of one-fifth of an inch (Smith & Bucks, of London, best objective glass), many of the blood corpuscles presented an irregular stellate outline. When viewed under high magnifying powers, as the one-eighteenth inch immersion lens of G. & S. Merz, of Germany, with eye glasses, to magnify 1,050 diameters, the crenated and stellate blood corpuscles were found to be studded upon the surface, with nodular rounded projections. The colored blood corpuscles appeared to be undergoing changes of form, as if nodular transudations of the globulin were forming upon the surface. These changes were most marked and frequent, upon the surface and outer portions of the clots, and resembled in some respects the amœboid movements of the coalescing corpuscles; the nodules were, however, uniformly diffused over the surface of the corpuscles. When the blood was examined, from the interior of the clot, the corpuscles were found conglomerated together forming rolls or piles, adhering together by their flat surfaces, like the rouleaux of the blood of inflammatory diseases and of the horse. The corpuscles which had been joined and agglutinated together by their flat surfaces, were normal in shape, and presented no stellate or nodulated outline as was the case with the corpuscles from the surface of the clot, and from the surrounding golden serum. It appeared as if the nodulated exudation had formed the bond of cement between the opposing flat surfaces. Upon standing twenty-four hours and longer, the colored corpuscles tended to dissolve and lose their outline, and the serum became colored from the escape of the coloring matter of the red globules.

The colored corpuscles appeared to be acted upon and altered by the urea and bile which chemic analysis revealed in considerable amount in the serum. After standing in an open beaker or in porcelain capsules for forty-eight hours, numerous vibrios made their appearance, as in other putrefying animal fluids, as blood, albuminous urine, and serous exudations. But no living animalculæ or vegetable cells or sporules or pigment granules were discovered even after the most diligent search with high powers, ranging up to the twenty-thousandth of an inch objective, in the fresh blood. The blood drawn from the arm during life putrefied much more slowly than that taken from the heart and large blood vessels after death. The blood was carefully examined by the best and most reliable chemic methods, and was found to contain a comparatively large amount of this constituent; large and well formed crystals of urea, and of the nitrate of urea, were obtained from comparatively small quantities of blood.

As much urea was obtained from 100 grains of the yellow fever blood as is ordinarily obtained from 7,000 grains of healthy blood. The serum was also carefully tested for bile, and was found to contain all the ingredients of bile. The blood also contained numerous small oil globules and in one of the specimens a distinct oily scum rested upon the surface of the clot. So striking was the oily appearance of the blood that it was noticed by the medical students who assisted during the bleeding. The presence of the urea in increased amount, and of the bile in the blood, were due to the suppression or arrest of the functions of the kidneys and liver. To the presence of these substances in the blood must be attributed in part, at least, the delirium, intoxication and aberrated muscular and nervous action, and to a certain extent the nausea, vomiting, gastro-intestinal irritation and black vomit. The altered shape of many of the colored blood corpuscles was certainly due, in a great measure, to the physical and chemical action of the urea and bile of the serum. Specific gravity of venous blood from the arm of this yellow fever patient, 1055.6. The density of this blood was somewhat below that assigned by physiologists and pathologists as the standard of healthy blood. Thus Becquerel and Rodier give the density of the defibrinated blood of the male as 1060, and of the female as 1057.5.

The specific gravity of the serum of the venous blood from the arm of this yellow fever patient was 1027. The specific gravity of the serum, therefore, did not differ materially from that of health; according to Becquerel and Rodier, the density of the serum of the male being 1028, and of the female 1027.4. The serum was of a deep yellow color, similar to the yellow color of the liver and of the diluted bile from the gall bladder of yellow fever subjects. Clot, soft, large, and without any very great contractile power. After the contraction of the clot the serum was tinged of a red color, from the presence of colored corpuscles and the coloring matters of the blood. The amount of serum forced out of the clot was relatively small and appeared to possess the power of dissolving the colored corpuscles upon standing in contact with the clot, the red color increasing gradually in depth. In these respects the yellow fever blood presented a marked contrast to healthy and inflammatory blood. Only 108 grains of serum could be obtained from a vessel containing 890 grains of blood.

Fibrin in 1,000 parts of venous blood abstracted from the arm of this yellow fever patient, 0.271. The fibrin was greatly diminished, being only one-tenth of the quantity present in the normal blood. The fibrin itself appeared to be of the usual tenacity, and the imperfect contraction of the clot appeared to depend rather upon the small amount of fibrin, than upon any physical or chemical change in the constituents of the blood. In the marked diminution of fibrin, we have a most interesting and important explanation of the cause of the hemorrhagic tendency in yellow fever.

The following are the chief characteristics of the blood in the stage of depression in yellow fever, as established by the preceding chemic analysis:

Specific gravity of blood and serum not specially altered.

Blood coagulated slowly and imperfectly.

Clot voluminous and soft.

Fibrin, quantity deficient and not more than one-tenth the normal amount.

Reaction of blood alkalin.

No deficiency of colored blood corpuscles, the dried blood corpuscles being 130.57, and the moist blood corpuscles 522.28. The organic matters of the moist blood corpuscles are normal in amount, while the fixed saline constituents are diminished, being only 1.78 in the blood corpuscles of 1,000 parts of blood.

The relation of the moist blood corpuscles to the liquor sanguinis, as far as quantity was concerned, was not disturbed, the former standing in relation to the latter in the 1,000 parts, as 522.28 of the blood corpuscles to 477.72 liquor sanguinis.

The albumen of the liquor sanguinis was diminished to a marked degree, being only 53.40 parts in 1,000 parts of blood. The extractive matters of the liquor sanguinis were increased. The extractive matters were complex, and included bile, urea and ammonia. The fixed saline constituents of the liquor sanguinis was not diminished. Without doubt the loss of albumen, as well as the presence of bile, urea and other excrementitious matters in the serum or liquor sanguinis, determine to a certain extent, at least, the character of the capillary circulation and the production of black vomit. The patient died twelve hours after this observation. The kidneys never acted and he appeared to die from the combined action of the febrile poison, bile, urea and other excrementitious matters, and the loss of blood during the slow but persistent hemorrhage from the gastro-intestinal mucous membrane.

Autopsy twelve hours after death: Exterior, superior portions of face, trunk and upper portions of limbs of a deep golden orange color. The lower dependent portions of the face and of the trunk and limbs were of a mottled, purplish, yellow and livid maculated appearance, as if the patient had been beaten with a club. The general appearance of the exterior of the body was horrible. Black vomit had run out of the corners of the mouth, and saturated the winding sheet, and had trickled in a muddy filthy stream along the sides of the face and neck. Features full and somewhat swollen. Belly full and tympanitic. Well formed muscular man, in the full vigor and strength of manhood. Large well developed chest, with full pectoral muscles. Arms full and round, with good muscular development. The left knee appeared to have been injured at some previous time, at least months if not years before the fatal illness.

The patella was displaced downward and outward laterally, and the joint was ankylosed. A small ulcer existed upon the outer aspect of the left knee joint, below the edge of the displaced patella. The left leg was a little shorter and smaller than the right. I had the bones carefully cleaned after death, and found that they had been altered by chronic inflammation, which had been attended with certain changes of the bony structure. This injury was of long standing, and had nothing whatever to do with the present attack, as the patient was able to perform active labor up to the time of his last illness, and the parts in and around the joint presented no swelling or discoloration. The patient appeared to have been suddenly cut off in full vigor and health, and in death resembled one into whose veins a deadly poison had been injected by a venomous reptile, which had not only poisoned, but also enveloped in its powerful coils and strangled its victim.

Head: Dura mater, pia mater and arachnoid membranes congested with blood. The brain was congested with blood, not only in its membranes but also throughout its textures. The brain and its membranes, however, presented no marks of inflammation —no exudation. Membranes of spinal cord congested with blood. The congestion of the blood vessels of the brain appeared to be similar in all respects to that of the capillaries and small blood vessels in the different organs and tissues. The consistency of the brain was normal. Weight of brain, two pounds and fourteen ounces; it was carefully tested for bile and urea. The infusion of the structures of the brain presented a bright golden color, like that of the serum. When carefully tested, the presence of the coloring matters and acids of the bile was conclusively determined in the cerebral structures. When the decoction of the brain was evaporated in a watch-glass and examined under the microscope, numerous beautiful stellate and prismatic crystals of the phosphates of lime, and ammonia and magnesia made their appearance.

When carefully tested for urea, according to the best methods known to chemists, the alcoholic extract obtained from the water extract was found to be literally loaded with the product of the metamorphosis of the tissues, and as large a crop of perfectly formed and characteristic crystals of the nitrate of urea were obtained as from an ordinary specimen of urine of moderate specific gravity. The brain contained more urea than any other organ, the liver not excepted. It was clearly established by this chemic examination that the urea existed in much larger quantity than in the healthy brain, or in the brains of those who die from diseases in which the action of the kidneys is not diminished.

Thorax: The pericardium was congested. As is usual in yellow fever, the capillaries and small blood vessels of the pericardium presented a beautifully arborescent appearance from the accumulation of colored corpuscles. I have in my possession a portion of the pericardium of a yellow fever patient, which I preserved by simply spreading upon a glass slide, and after drying, saturating with Canada balsam and covering with a glass slide. The preparation shows an intense congestion of the blood vessels and capillaries, and so numerous are the colored corpuscles, and so brilliant the colors, that the preparation resembles the best injections with the most brilliant carmine. The pericardial sac contained about two ounces of bright golden colored transparent serum.

The heart presented a brownish-yellow appearance, resembling the pale flabby heart of scurvy. The textures although softer than in the normal heart, were, however, firmer than in well marked fatty degeneration. The muscular textures of the heart required considerable pounding in the mortar to reduce them to fragments sufficiently small for decoction. The decoction of the heart in distilled water was loaded with golden-colored oil, which floated in a thick scum upon the surface, and it resembled in its rich oily nature the richest soup made from the marrow and fat of the bones of fat well fed animals. The fat was far more abundant than is usual in the heart of malarial fever or other diseases in which there is no fatty degeneration of this organ. The filtered decoction of the heart was of a golden yellow color. The decoction of the heart contained bile in abundance. As the decoction of the heart, after careful filtration, slowly evaporated in a porcelain capsule, a deep orange-colored ring formed around the sides of the vessel. Weight of heart, eight and one-half ounces. Both cavities of the heart contained blood. Several small, ropy, golden-yellow clots were also discovered in the cavities of the heart. The muscular tissue of the heart appeared to have lost its tenacity and to have become relaxed and somewhat softened; and this view was confirmed by microscopic examination. The heart was also carefully tested for urea, and this substance was clearly detected in considerable quantity, but in relatively less amount than in the brain. Under the microscope, oil was found in the form of minute globules, diffused through all the tissues of the heart, and even within the ultimate muscular fibers. The muscular fibers of the heart presented under the microscope, a granular appearance, and the transverse striæ were not as distinct as in normal hearts. The increase of free fat or oil in the structures of the heart was therefore determined by the microscope and by actual experiment. The heart contained therefore in comparatively large amounts, bile, urea, oil.

No animalculæ or vegetable cells or spores were observed under the one-eighteenth inch immersion objective of Merz, either in the blood or textures of the heart.

To be continued.

THE EARLY DIAGNOSIS OF CARCINOMA OF THE STOMACH, WITH THE BACTERIOLOGY OF THE STOMACH CONTENTS.

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(Concluded from page 406.)

Abelous (*Revue de Therap. Medico-Chir.*, April 1, 1890) found sixteen species of microörganisms in his own stomach after fasting; ten of these he asserts could form lactic acid. This has not been corroborated by other similar experiments. Abelous makes no control, nor does he prevent contamination from the mouth and esophagus. In Miller's experiments the stomach contents were secured from a patient who could regurgitate the contents at will at any time. After disinfecting the patient's mouth with bichlorid 1 to 1,000, Miller secured the contents of

the stomach. On examination he discovered many microörganisms which he had previously found to be present in the mouth, among these the bacillus lacticus.

The esophagus is a perfect culture bed. Its folds form a favorable nidus for microörganisms. Unless this is specially considered, error may arise, since contamination from the esophagus easily takes place.

The lactic acid forming bacilli can be found in the stomach in health, as well as in disease. However, it is doubtful whether the colonization of the bacillus lacticus can be demonstrated in the healthy stomach, to such an extent as in carcinoma, and more particularly carcinoma pylori.

CHEMIC METHODS.

The presence of lactic acid in the stomach contents is determined by Uffelmann's and Nessler's reagent. The quantity of lactic acid in the stomach contents is estimated by Boas' method. This is as follows: The patient's stomach is washed out with sterilized water in the evening. The patient then takes oatmeal gruel which is prepared by boiling a tablespoonful of oatmeal and a pinch of salt, in 1,000 ccm. of water. In the morning the stomach contents are drawn off and filtered. The filtrate is concentrated upon a water-bath, until a reaction with Congo red paper fails. Barium carbonate is then added which combines with the lactic acid to form a lactate. This is brought to the boiling point, to drive off the CO_2 and volatile substances. The lactate is then treated with phosphoric acid which sets free the lactic acid. This is extracted with ether; the ether evaporated, and lactic acid mixed with alcohol remains. The residue is then treated with an oxidizing agent, to change the lactic acid to acetic aldehyde. It is here where Boas' method is faulty; alcohol when oxidized also forms an aldehyde. To avoid this error, Dr. Wesener made an essential modification: before oxidizing the lactic acid which may also contain alcohol, Wesener treats the residue with barium carbonate, and evaporates nearly to dryness. This drives off the alcohol and does not affect the lactate. The lactate is again treated with phosphoric acid and boiled, to remove the CO_2. After this, Boas' method is carried out: The solution is diluted with 45 ccm. of water and 5 ccm. of sulphuric acid, and about 30 to 40 grains of black oxid of manganese added. This solution is placed in a 200 ccm. flask which is connected with a Liebig condenser and gently boiled, and distilled until four-fifths of the material has passed over. (The lactic acid has been converted into acetic aldehyde.) The distillate is treated with 20 ccm. of a decinormal solution of iodin, and 20 ccm. of a normal caustic potash solution. At this point iodoform, potassium iodid and iodite are formed; 20 ccm. of HCl, sp. gr. 1018 is added which liberates all of the iodin not used in the formation of iodoform. Sodium bicarbonate is used to neutralize and a decinormal arsenic solution is added in excess. The excess of arsenic is filtrated back, with a decinormal iodin solution. Starch is used as the indicator. The difference in the number ccm. of decinormal iodin and decinormal arsenic solution is equal to the iodin required to change all of the acetic aldehyde to iodoform. This result is multiplied by .003,388 which equals the lactic acid present in the stomach contents used. Compute to 100 and this represents the percentage of lactic acid.

BACTERIOLOGIC METHODS.

For bacteriologic purposes the contents of the stomach are taken:

1. From the fasting stomach.
2. After a test meal according to Ewald.
3. After test meal according to Boas (oatmeal soup at night and withdrawn next morning).
4. The stomach is washed out with sterilized water and the water that remains is aspirated.

The gyromele is introduced according to the method as described in the *Wiener med. Wochenschr.*, Nos. 1 and 2, 1895. To avoid error of contamination, the mouth and esophagus should be cleaned. Microscopic examination is made of the contents. A stain is irrigated through, by placing the stain on one side and a blotter on opposite side of the cover-glass. When any field of interest is presented it can be divided and mounted according to the usual methods.

Drop cultures are made from the stomach contents, using the contents as a nutrient media. The development of bacteria under the microscope may be observed for hours in succession. The observation of the growth of some of the algæ is very instructive by this method. Line cultures may be made upon the sterilized mucous membrane of the stomach of pigs.

The mucous coat is dissected from the muscular coat, stretched upon a glass plate and sterilized at 50 to 55 c. four hours each day for one week. The ordinary moist chamber allows contamination to take place. To avoid this I devised the following method: A glass battery jar is placed upon a common dinner plate; a second jar of larger size is inverted so as to cover and inclose the first jar; a solution of 1 to 1,000 bichlorid is poured into the plate to form a water valve; a few folds of filter paper interposed between the inner and outer jar prevents rapid evaporation. Two glass tubes pass from the outer jar to admit air and when plugged with cotton prevent contamination. This moist chamber is sterilized and the culture plate placed in the inner jar, and sterilized by fractional sterilization as before mentioned.

Thus the coagulation of the albumin is prevented. The ordinary sterilized platinum needle is used, dipped into the material derived from the stomach. Line cultures are made by drawing it lightly over the surface of the sterilized mucous membrane used as the culture bed. Five or six strokes or lines are sufficient. The third line will isolate colonies for pure cultures (fished under the microscope fifty diameters). The colonies can be forced without melting the medium, and it furnishes as near a natural culture bed as possible for artificial cultivation.

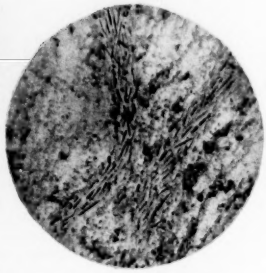
To favor the development of lactic acid microorganisms, the surface of the culture medium may be sprayed with a thin mixture of starch water. When desired the mucous membrane can be dried like parchment and the colonies preserved *in situ*.

Nutrient gelatin and agar-agar for tube cultures. This is prepared by the usual method, except in place of beef extract, I use the extract from the mucous membrane of the stomach of pigs; 5 to 20 per cent. of gelatin is added, or 1 to 2 per cent of agar-agar. The addition of sugar to the culture material is often an advantage in the study of stomach bacteria.

Liquid Media.—Extract from the mucous membrane is prepared by taking one-half kilogram of finely minced mucous membrane of the stomach of a pig, covered with 1 liter of distilled water and left in

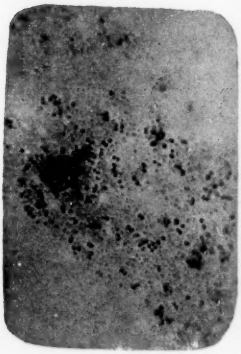
COLONIES TAKEN DIRECT FROM THE STOMACH AND MOUNTED.

No. 1. 600 diam.



No. 2. 1,200 diam.

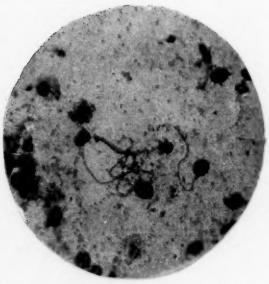
No. 3. 1,250 diam.



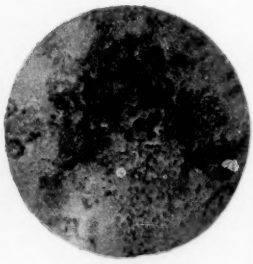
No. 4. 1,200 diam.

No. 5. 1,250 diam.

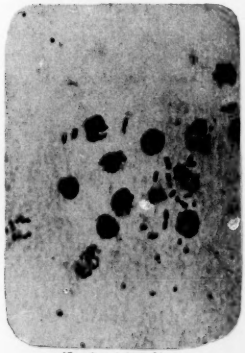
No. 6. 600 diam.



No. 7. 1,250 diam.



No. 8. 1,250 diam.



No. 9. 1,250 diam.

Nos. 1 to 5, inclusive, from cases of carcinoma of the stomach. Lactic acid forming microörganisms. Nos. 6 to 9, varieties of algæ from cases of simple dilatation of the stomach.

the refrigerator for twenty-four hours. This may be sterilized by fractional sterilization as in the preparation of blood serum. To this may be added starch, grape sugar, milk, or brewers' liquid malt, which must be obtained fresh from the brewery. This is used for the study of fermentation and germs of putrefaction.

In place of the extract of the mucous membrane, I find it an advantage in some cases, to use the sterilized filtered contents of the stomach. This can be prepared and kept for use as desired.

The method of preparing the stomach of living dogs for the study of the growth of bacteria found in the human stomach has been referred to on page 317 of the JOURNAL.

CONCLUSIONS.

1. Carcinoma of the stomach early creates a soil for the rapid development of microörganisms.

2. The lactic acid forming germs grow more readily in carcinoma of the stomach than in other diseases of that organ.

3. Lactic acid germs found colonizing in the stomach are of great diagnostic value in carcinoma.

4. The absence of germs does not exclude carcinoma.

5. The determination of lactic acid of fermentation by Boas method, as modified by Wesener, is of diagnostic value.

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SOCIETY PROCEEDINGS.

American Electro-Therapeutic Association.

Fourth Annual Meeting held in New York Academy of Medicine, New York, Sept. 25, 26, and 27, 1894.

(*Continued from page 286.*)

WILLIAM J. HERDMAN, M.D., President.

AFTERNOON SESSION.

The meeting was called to order by the President at 2:30 P.M.

MR. W. J. JENKS, M.A.I.E.E., of New York City, read a paper on

DIRECT CURRENT DISTRIBUTION.[1]

When I was asked to contribute a paper at this time I replied that I had nothing to tell which could be of service to those who used electricity on the spot where it was generated, and applied it without distribution over large areas to purposes of which I have but a vague comprehension. I had expected, in becoming an Associate Fellow, to gradually inhale a medical atmosphere, which like a fresh supply of oxygen from the rarefied air of an unusual altitude, would bring to my own mind and body greater vigor. But I had not counted upon exhaling any ideas which might help to establish a reciprocal relation between the medical and the engineering factors of this Association. If therefore I succeed in doing so, I shall enjoy an unexpected pleasure, and you may credit with whatever useful suggestions I may offer, the account of our good friend the Secretary, by whose courteous invitation I am here.

I hesitate very much to attempt, in the presence of a gathering of trained scientific observers, any re-statement of established truths, and in apology for so doing I offer to you only the assurance that every such repetition makes the principles which underlie electrical action seem clearer to my own mind. I am in a measure reassured by the thought that even to the vision of the most eminent physicists of these closing years of a marvelously fruitful century, many phases of the production and operation of the mysterious servant which we are trying to harness, are still seen only "through a glass darkly."

My knowledge of your science is not sufficient to enable me to do more than suggest, with much diffidence, one or two lessons which my own department of electrical work may possibly teach physicians. If there are others, I am sure your perception of the necessities of your section of the art will promptly recognize and apply them.

Until we know what electricity is, we can not accurately define "electrical distribution." We may conceive of the behavior of electricity as resembling or analogous to that of a liquid stored in reservoirs or flowing in pipes; we may speak of its development and the transmission of power by its aid from point to point as the generation and circulation of a current; we may imagine that we are handling a ponderable substance when we measure the effects produced by its presence or by the expenditure of its energy.

Whether it should be called a tangible though imponderable entity, or an ether-like medium which may be started into vibration or circulation by the expenditure of energy, or simply one of the group of fundamental forces by which all created things are held together and maintained in that state of vibratory change which is the life of the material universe, it is not necessary that we now inquire, and if it were, I should not stand here and attempt to answer. It may be useful for us to recall the definition given by our distinguished Honorary Fellow, Prof. E. J. Houston, in his "Electrical Dictionary:"

"*Electricity.*—The name given to the unknown thing, matter or force, or both, which is the cause of electric phenomena.

[1] It is but fair to state that the author of this paper considers it practically unintelligible without illustrations, which unfortunately, for want of time, must be omitted in this publication.—EDITOR TRANSACTIONS.

Electricity, no matter how produced, is believed to be one and the same thing. The terms *frictional-electricity, pyro-electricity, magneto-electricity, voltaic or galvanic-electricity, thermo-electricity, contact-electricity, or animal or vegetable-electricity, etc.*, though convenient for distinguishing their origin, have no longer the significance formerly attributed to them as representing different kinds of the electric force."

In this definition we find a foundation for the statement (which is important in considering the limitations of the subject assigned to me) that if we form a clear conception of the comparatively simple phenomena of the distribution of direct currents, (constant in direction), we shall be prepared to appreciate to a greater degree the complicated and involved phenomena which appear when we distribute currents of alternating direction. I have taken the liberty to depart slightly from the letter of my topic as announced, in order to include currents which are always *the same in direction*, irrespective of whether they are "constant" in the sense employed by electrical engineers, that is, of unvarying strength or rate of flow. As a part of the groundwork of this discussion it may be convenient also to remember that such currents may for practical purposes be excited by primary or secondary chemic batteries, magneto or dynamo-electric machines or pyro-magnetic generators, though the last-named source of electrical energy is still in what we may call an experimental stage for the purposes of producing any considerable electro-motive force.

I may perhaps be excused for illustrating some features which attend distribution from either of these sources in the way which makes the results most clear to my own mind. Possibly the method may not appeal as plainly to others.

It is only about fifteen years ago that the electrical engineer was called to deal with the distribution over large areas, of currents representing many mechanical horse-power. The possibility of doing this work commercially was a direct result of the discovery by Faraday of the law of magneto-electric induction, by which for the first time the product electricity was secured at a cost which bore a reasonable relation to that of the power required to excite it. For seventy years the world was in possession of the most brilliant and efficient source of light which man had ever devised, the electric arc, without applying it to the illumination of streets and houses. Such applications suggested themselves to Sir Humphrey Davy in 1810, but there were grave difficulties to be overcome. One of these, the wasting of the carbons, which are in part vaporized and in part dissipated by ordinary combustion, was overcome by the invention of regulators or arc lamps.

The second arises from the operation of that inexorable law which, (in the language of a noted scientist) throughout the material universe demands an eye for an eye and a tooth for a tooth, refusing to yield the faintest glow of heat or glimmer of light without the expenditure of an absolutely equal quantity of some other power. Hence, in practice, the desirability of any transformation must depend upon the value of the product in relation to that of the power expended. The metal zinc can be burned like paper; it might be ignited in a flame, but it is possible to avoid the introduction of all foreign heat and to burn the zinc in air of the temperature of this room. This is done by placing zinc foil at the focus of a concave mirror, which concentrates to a point the divergent electric beam, but which does not warm the air. The zinc burns at the focus with a violet flame, and we could readily determine the amount of heat generated by its combustion. The zinc can be burned not only in air but in liquids. It is thus burned when acidulated water is poured over it; it is also burned in the voltaic battery. Here, however, to obtain the oxygen necessary for its combustion, the zinc has to dislodge the hydrogen with which the oxygen is combined. The consequence is that the heat due to the combustion of the metal in the liquid falls short of that developed by its combustion in air, by the exact quantity necessary to separate the oxygen from the hydrogen. Fully four-fifths of the total heat are used up in this molecular work, only one-fifth remaining to warm the battery. It is upon this residue that we exclusively depend, for it is solely out of it that we manufacture our electricity.

So ruinously expensive is this process of burning zinc when the electrical engineer is called to develop large powers, that the world waited, as I have said, until it was discovered that those other and greater storage batteries, the coal beds, which represent the activity of ages past, might be pitted against the waterfalls, which represent Nature's activity of the present, in a grand competitive effort to provide man with a magic wand in response to which all the mighty forces of the sunlight and the ocean would marshall themselves to do his bidding.

It was some time before the electrical engineer acquired confidence in his own ability to produce and distribute successfully the high pressures demanded by many street lamps in series, and to handle the lower potentials when expended at the rate of hundreds or thousands of volts for each ohm of conductor or translator resistance.

The coming of the electric arc lamp, requiring nearly a horse-power of mechanical energy for each large unit of light, and the softer incandescent or glow lamp which only gave from one hundred and ten to one hundred and twenty-five candles of light for each mechanical horse-power, usually in the form of seven or eight lamps of sixteen candles each, demanded an electric current representing 1,000 horse-power for each 1,000 arc lamps required for the lighting of the streets of a city, or each 7,000 glow lamps for stores and dwellings.

There is perhaps no more impressive example of almost irresistible power than a modern high speed locomotive and its vestibuled limited express train flying at the rate of a mile a minute between the great cities of the United States. The total weight of such a train is from 400 to 500 tons, or from 800,000 to one 1,000,000 pounds, and a speed of seventy-five miles per hour is sometimes attained. The energy of 400 tons moving at that speed is nearly twice as great as that of a 2,000 pound shot fired from a 100 ton Armstrong gun. But these illustrations express a power only about one-half of that which was last year constantly required for the lighting of the art gallery at the World's Columbian Exposition by 16,000 incandescent lamps. Because under ordinary circumstances the electric current speeds along the motionless conductor without causing a quiver or vibration perceptible to our eyes or ears, we are apt to overlook the fact that its power for great usefulness and instantaneous transmission of a variety of manifestations of energy, when properly directed, is equalled by its ability to do serious mischief whenever it escapes from our control.

The possibility of commercially generating electricity on such a scale was only realized when the modern dynamo-electric machine was made practical and by its means the tremendous energy of motion derived from the power of waterfalls and steam boilers was substituted for the feeble combustion of chemic cells. The coils of the armature of the dynamo, being forced by the resistless pressure of steam to revolve between the poles of powerful magnets in the field of magnetic force, and in spite of the attraction with which that force opposes the revolution, develop and send out this marvelous agent which we call electricity, not in transitory sparks like the discharge of the Leyden jar, not in an almost microscopic wave like the pulsations of a telegraph or telephone circuit, but in a maintained succession of powerful throbs following each other in such close intervals of time as to constitute a practically uniform flow of any volume we desire, so that we popularly speak of it, for want of a better analogy, as if it were water or gas and moved in tangible particles from point to point.

The physician who desires to draw suggestions from the experience of the electrical engineer may profitably reflect upon a few primary truths which he may have known in the abstract, but which may never have been presented to him as possessing concrete importance.

1. Electricity is not a source of energy, but only an intermediary agent.

2. It has one fundamental characteristic by which we make it available, namely, *pressure*.

3. All its useful engineering results are accomplished by the expenditure of this pressure.

4. By providing a conducting track or circuit of considerable length, two objects may be secured; 1, transformation of energy; and 2, transference or transmission of energy.

5. The electrical pressure is expended in every part of the circuit (including the mechanism of the generator) in direct proportion to the resistance encountered.

6. It thus becomes possible to transmit and localize the expenditure of the electrical equivalent of the initial mechanical energy with which we start out, at any point or points desired, always considering the inevitable losses which take place in transformation and transmission; and to vary those losses within any limits which conditions of safety and of commercial investment may permit.

Let us discuss each of these statements with some care.

The engineering practitioner does not recognize in electricity a source of energy. He realizes that to obtain it he must expend some initial force that costs him money, and can never expect to recover all of what has been thus spent. He is not able to make electricity available to him as a force

which directly completes any useful operation. Perhaps there may be those here who can tell me whether in the application of electricity to the human mechanism, the mysterious agent is itself directly effective, or whether it can be relied upon only to convey to the proper point a potent energy, so flexible, so obedient to known laws, that the intelligent physician can predict the result of its transformation to heat, to chemic action, or to some other desired manifestation of what may be, for aught we know, a single all-pervading energy.

In the everyday application of electricity to commercial problems of distribution, it is an intermediary agent, having two great features of utility: 1, it transforms or translates one manifestation of Nature's forces into another; 2, it transfers energy (while in the intermediate state which we call electrical action) from point to point instantly. As an intermediary agent it is thus both a skillful magician and a swift-winged messenger. By its action, one manifestation of natural power, as for instance the motion of a waterfall, disappears, and in its stead another and more useful manifestation of heat, light or chemic action is developed, either in the same place or a different place, as we desire. When we wish it to transmit or transfer power, we connect with the source of energy a suitable path in the form of a material which readily conducts electrical impulses, and we find the power appearing at the objective point before we can realize that the transmission has taken place. Wherever, in the path thus provided we wish to do useful work, we place an obstruction which the electricity must overcome, and in the operation of surmounting such an obstacle a part, or practically the whole of its energy may be expended. While we can not tell what electricity is, we can say that for the purposes of practically generating and controlling it, it has but one element, namely, a "pressure," "strain," or "tension," which in systems of electric lighting, for example, is steadily generated by the dynamo, which is the mechanism in which the electrical force first appears, and that it is as steadily expended in the "circuit" or path by which we connect the outgoing and the incoming terminals of the dynamo, and with such instantaneous effect that the moment we connect such a source of power with a conductor forming a complete circuit, the pressure has traversed the entire path and has spent its entire force. At every point in this path, or, more accurately, between any two points, no matter how large or easy this path may be, we find that some fraction of this total pressure has been expended in exact proportion to the opposition it has met, or, in other words, to the resistance it has encountered. As long as the connection with the source of power is kept up, this generation and expenditure may be maintained; the instant we break the connection at any point in the complete circuit all action ceases, because the electrical pressure generated before the break occurred has been instantly used up or transformed into some other form of energy, such as heat, light, magnetism, chemic action or motion. The portion of the initial pressure which is inevitably expended between the point where it is generated and the point where it is made useful in a "translating device" is transformed into heat and disappears, thus being, so far as any useful result is concerned, lost or wasted. Hence the loss of pressure in transmission is often called "drop" in pressure, and the energy thus lost is known as "heat waste." The translating device may be a lamp, a heater, a motor, a plating bath or a magnet; in short, any mechanism within which the energy of electricity may be translated or transformed to some other serviceable form of energy.

Thus the function of all electro-generative apparatus applicable to systems of distribution is to develop or maintain, or both, a useful difference of potential between its terminals. If a direct current is to be interrupted or pulsatory, the potential difference may be momentary or transient; if the current is to be continuous, whether variable or constant in its strength, a useful potential difference must be *sustained in spite of the opening of an outlet* by the completion of a circuit, and the resulting tendency to a reduction of difference of potential to an equilibrium, with the expenditure of the initial potential.

It is difficult for us to conceive of the rapidity of electrical action. Whether we consider the transformation of chemic action or mechanical force into that form of molecular tension or pressure or strain which we call electro-motive force, or whether we think of its expenditure through a conducting path which forms a complete circuit we have, so far as our senses can discern, instantaneous conversion to electricity, and instantaneous expenditure resulting in heat, light, magnetism, chemic action or motion.

We can not then measure the rate of the expenditure of E. M. F. in *time* (so many volts per *second*), but we can measure its rate of expenditure in the *resistance of the circuit* (so many volts per *ohm*), and this rate of expending volts in each ohm is what we call the current or ampères.

When we develop electrical potentials we expend a measurable power, but afterward if the potential is not expended (that is if the charged body is perfectly insulated, by surrounding it by material which offers infinite resistance to oppose the pressure), no power is required to maintain it. Hence, in doing useful work it is not the first development of the potential which costs the effort or the money, but the maintenance of the potential when the restraining resistance is lessened and we allow the potential to escape or equalize itself at any rate (per ohm) which we desire.

The result secured in useful power from the expenditure of a maintained E. M. F., varies directly as the rate of expenditure in each unit of resistance, or in other words, directly as the ampères.

Thus the "volts" considered alone do not express the power required for generation, nor the power recovered in some useful result. Doubtless every one here present has often noted the very small power required to develop a frictional spark; yet that spark may represent a voltage far beyond that of any direct current dynamo now operating arc lamps in this city. In order to expend itself it has to overcome an enormous resistance in the form of an air space, and the rate of expenditure of volts per ohm of this great resistance is so minute that we have perhaps no instrument except the telephone which can detect it, and we can not even then measure the infinitesimal rate in ampères.

Nor is it the "ampères" alone which become a measure of the work done. Every member of this Association may have noted the uncertainty of attaining a current of a given number of milliampères by the application of a given number of cells of battery in the treatment of any given tissue. The battery may be in some cases justly loaded with its share of blame because it may at any moment fail to develop its usual voltage, but you are dealing with an unknown, or only approximately known, or even a variable resistance, and the expending of 10 milli-volts per ohm (which is simply another form of expression for securing a current of 10 milliampères) gives very little idea of the electrical power which is being expended in that part of the circuit formed by the tissue under treatment.

The rate of expending energy or doing work between any two points in an electrical circuit is known only when the total potential there absorbed or expended is found, and multiplied by the rate of such expenditure in each unit of resistance between the points considered. That is, it is only known when volts are multiplied by ampères, and is expressed by the resultant "watts." Here, in electrical distribution, we have the basis of a measurement of energy necessary to keep up the battery or turn the crank or pulley.

But the watts give only a *rate* of doing work. To know what *aggregate* work is done, we must add another factor, time. And so the physician should be able to record the three factors—*volts*, *ampères* and *seconds*, which alone can give the "joules" of energy expended or work accomplished either in heat developed, or chemic action stimulated. The time is at hand when by a single instrument, self-recording, the skilled electrical specialist may read on a tape (with the ease that cable operators now read by the siphon recorder of Lord Kelvin) the record of each application in total potential applied, rate of expenditure of volts in each unit of body resistance, variation of such resistance under the application of the electric energy, and duration of treatment.

In the distribution of electrical energy from a generating source to translating devices, the electrical engineer utilizes the laws to which I have referred by connecting the translators in one of two ways:

1. In series, so that the same current passes *successively* through all the devices.

2. In multiple arc or parallel, so that the entire current passes *simultaneously* through all the devices, each of which receives a fraction of the total.

The series or successive arrangement is roughly indicated in the upper diagram of Fig. 1. At the left of this diagram, I have indicated the generator by an upright spiral extending from a zero line at the base of the diagram to a line marked 400 and then bending over to the right and falling to an elevation of 300. By this I design to indicate that in the armature coils of the generator a total E. M. F. of 400 volts is generated, and that under the conditions assumed, 100 volts is expended within the armature itself, leaving 300 volts to be usefully applied to outside distribution. The

line extending to the right from the upper extremity of the spiral (at 300 volts) indicates a conducting wire, and the fall of the wire from the 300 volt line indicates that 50 volts have been expended in this division of the circuit. The two heavy vertical lines with a small space between them indicate the carbons of an arc lamp, and it is assumed that 50 volts additional is expended in this lamp, causing a sudden drop of the potential to 200 volts. Beyond this lamp comes another length of conductor, a second lamp, and a return conductor twice as long as each of the two upper sections of the line, and occasioning twice as much drop, or 100 volts. This brings us back to the zero point or negative terminal of the dynamo, and for convenience of illustration I have shown near this negative brush a current indicator standing at 10 ampères, which is assumed to be the normal current of the circuit here illustrated. The denominators of the several fractions (which are written in black) indicate the number of ohms resistance assumed to exist in the various parts of the circuit, 10 ohms in the armature coils, 5 in each upper division and 10 in the lower division of the line, and 5 in each lamp; 40 ohms in all. As it is assumed also that 10 volts is expended in each ohm (that is, 10 ampères of current flows) the number of volts indicated in red and to which I have already explicitly alluded, is found by multiplying the number of ohms by ten. It will be understood that I am here illustrating the law of series distribution by assuming an exaggerated case. No competent engineer would provide or recommend a dynamo in which would be expended 25 per cent. of the total energy produced; nor a conducting wire which would cause a drop of 50 per cent. of the total E. M. F. generated. It is, however, customary to use for series arc lamp circuits a size of wire which has a resistance per mile of about 5 ohms.

The middle figure of this diagram is intended to illustrate the same system after two or more lamps have been added, and while the dynamo is generating the same total E. M. F. of 400 volts. The only difference in the resistance of the system as thus modified is the additional 10 ohms introduced by the two new lamps, but this modification is sufficient to cause an entirely different distribution of the fall of potential. As the resistance of the entire circuit is now 50 ohms, the total 400 volts must be expended at the rate of 8 volts per ohm, and the ampere meter accordingly indicates 8 amperes. There is 80 volts drop in the armature, 20 volts in each of the four upper divisions of the line wire, 80 in the return and 40 in each lamp, under the assumption that although the current is reduced, the lamps have maintained their original resistance of 5 ohms. This reduction of the current flow causes an abnormally small light in each lamp, and it becomes necessary to take some action to restore the current flow to the normal standard of 10 amperes.

This restoration is accomplished by the process of regulating the generative capacity of the dynamo, or in other words causing it to generate a sufficiently higher total E. M. F. so that the fall of potential through each division of the circuit may be restored to 10 volts per ohm. This result is indicated in the right hand of the three sketches which constitute the upper diagram. The spiral indicating the generating coils is extended upward to show that it now generates 500 volts, of which 100 is absorbed within itself and 400 is expended in the outside circuit at the rate of 10 volts per ohm. The ampere meter again indicates 10 ampères. From this it also appears that the dynamo attendant may be guided, in the operation of a series system, entirely by his ampere indicator, the current being the constant factor in the operation of such a system.

It may be convenient in this connection to summarize the peculiarities of the series method of distribution:

Constant Factors:

1. Expenditure of E. M. F. (amperes).
2. Dynamo resistance.
3. Dynamo internal drop.
4. Line (conductor) resistance.
5. Line drop.

Variable Factors:

1. Number of translators (and hence resistance).
2. Resistance of individual translators.
3. E. M. F. generated.

It will be noticed that in the above summary I have stated that the resistance of individual translators is variable, though in the diagram it has been assumed to be constant in order to simplify the illustration.

The action of a series electrical system may perhaps be better understood by noting the very general analogy which is afforded by a system consisting of a hydraulic pump and water wheels connected by a closed pipe so as to form a system in which a given quantity of water circulates perpetually. Whenever work is done by turning the pump, and thus producing a difference of pressure between the receiving and the discharging side of the pump, the water will circulate through the pipes, and thus transmit in the form of pressure the power which drives the pump, to the wheels, where the energy of the pressure will be re-converted into useful mechanical motion.

Such a form of apparatus is illustrated in Fig. 2, where the pipes are assumed to be made of glass. Tubes arising from several points in the circulatory system (as for instance from the upper or high pressure side of the pump at A, also from the pipe B beyond the first wheel, also from a point C on the pipe beyond the second wheel, and at D, representing the level of the return pipe) will show the water standing at the same level in all the pipes while the apparatus is at rest, as indicated by the line of equilibrium L^0, in the left hand diagram. When, however, the pump is rotated, the water will stand at different levels in the different tubes, as illustrated in the right hand diagram, ranging from a high level, L^1, at the high pressure or discharging pipe of the pump A, gradually dropping at L^2 and L^3 in the tubes B and C, as it passes through successive wheels, losing some pressure at each wheel, to a low level (indicated by L^4) at the return pipe where the tube D is attached, when all or nearly all the pressure due to the action of the pump has been expended.

The difference of level between the highest and lowest points (A and B) indicating the total drop in pressure (neglecting the small drop in the return pipe), will represent the available pressure for distribution and for useful work, corresponding to the potential difference or voltage in the electrical system of Fig. 1. In case all the wheels were close to the pump, no perceptible loss or drop would occur in transmission from the pump to the first wheel, or between the wheels, or in the return pipe. The product of the difference of pressure between a point above and a point below one of the wheels, multiplied by the volume of flow (which indicates the rate of expenditure of such pressure) is the measure of the energy expended in operating each of these useful devices. Any break in the pipe or interruption of one motor stops the action of the whole system.

Thus illustrated, we conceive of electricity as completely filling the system of generation, distribution and translation, whether it is moving or at rest. We neither create it nor destroy it, any more than we create or destroy the water in the pump system; we simply start the dynamo and thereby disturb the equilibrium of the electricity which we assume pervades the whole system, and we thus give it pressure or head. This pressure results in motion or current (so-called); and this pressure is expended (or as we say, a drop is produced), at every point in the entire circuit in proportion to the resistance which the pressure encounters, some of it being expended in "internal drop," that is, in the generating mechanism, some in "conductor drop," and a large percentage (in a well organized system) in useful "work" by the translators. The same current which starts out from the dynamo returns to it after being deprived of its pressure to receive another charge of energy and start again to repeat its work. The "work" expended in the translators, added to the "conductor drop," is equal to the difference of potential or "voltage" at the terminals of the dynamo, and this voltage multiplied by the "current" or rate of expenditure of the potential in unit resistance, shows the total energy delivered by the generator to the circuit. Any break in the conductor, or any accident to a translator (in the series system, which we are now considering) stops the action of all the devices in the circuit, and may interfere with the action of the generator. The electricity itself costs us nothing; the pressure is all we pay for.

A good illustration of what has proved to be perhaps the best method of effecting the regulation of a series dynamo is afforded by the well-known Thomson-Houston type of generator, shown in Fig. 3. Here the variation of total E. M. F. is effected by an automatic magnetic device which moves the brushes toward the point on the commutator which represents the highest E. M. F., or away from that point in accordance with the increase or decrease of the strength of the main current which circulates through the governing coil. With such a dynamo, capable of operating for example forty arc lamps in series, and thus delivering, a maximum voltage of about two thousand automatic regulation is secured between wide limits, usually from the full number of lamps for which the dynamo is made, down to about the voltage required for ten lamps and the connecting circuit.

The second method of electrical distribution, which I have called the multiple arc or simultaneous method, is accomplished by leading out from the terminals or brushes of the generator to any required distance, two conductors practically parallel with each other, and connecting between them, by parallel cross wires or electrical bridges, two or more translators so that a multiplicity of paths is created for the expenditure of the pressure, and all the translators at any time actively placed in these multiple branches receive simultaneously the proper voltage and a fraction of the total current delivered by the generator. Each translator is therefore independent of all the others.

This is the reverse of the series method, for in the series system (with a varying load) the proper total voltage varies directly as the number of translators and the proper current is constant; while in the multiple arc system (with a varying load) the proper total voltage is the constant, and the current varies directly as the number of translators. In this general statement contrasting the two systems, I have not made mention of the conductor drop, which for the purposes of this statement is an immaterial factor.

In the lower diagram of Fig. 1, a multiple arc system is indicated under three conditions corresponding with those of the series system which forms the upper diagram of the same figure. In the left hand sketch the spiral indicating the generator coils is much shorter than that of the series generator immediately above, illustrating that under ordinary circumstances the standard of voltage delivered by a multiple arc generator is much lower than that of a series generator operating the same number of translators. With two 50-volt lamps I have assumed the total E. M. F. produced by the dynamo to be 110 volts; the resistance of the armature, the outgoing conductor, and the return conductor to be 1 ohm each, while that of the lamps is the same as in the series system, 5 ohms each. But instead of offering a total resistance of 10 ohms, as in the series system, the two lamps in the multiple arc offer only 2.5 ohms; hence, in order that the same percentage of the total E. M. F. may be expended in the distributing conductors, the resistance of these conductors must also be greatly less than those of the series system having the same length. I have illustrated this idea by assuming that these multiple arc conductors have a total resistance of only 2 ohms instead of 20 ohms as in the series system. As each lamp requires 10 ampères, the total current is 20 ampères. Proper action of this system is indicated by a volt meter connected at a point on the circuit near the lamps through pressure wires, and showing to the dynamo operator the normal working conditions.

The middle sketch illustrates the re-adjustment of potential which happens when two more lamps are connected in multiple arc, and the total E. M. F. is not changed. Instead of increasing the resistance of the outside circuit (as was the case in the series system) this addition of lamps decreases it from 2.5 to 1.25 ohms, and consequently this lamp division of the circuit causes a less number of volts of the same total E. M. F. to be expended. The diagram shows that the pressure has dropped from 50 to 32 volts at the lamps, and this change is instantly indicated by the volt meter to the dynamo operator.

Regulation in this system consists in so increasing the total E. M. F. that the lamp voltage shall return to 50, and in the right hand sketch we see the conditions which exist when this result has been accomplished. The current has risen to 40 amperes, which is equivalent to saying that it has been restored to the normal standard of 10 ampères per lamp, but in these multiple arc cases it has not been necessary for the dynamo attendant to concern himself about the ampères delivered, but only regarding the volts supplied to the translators operating in parallel.

We may here summarize some of the peculiarities of the multiple arc method of distribution:

Constant Factors.

1. Available E. M. F. at translators.
2. Dynamo resistance.

Variable Factors.

1. Number of translators (and hence resistance).
2. Resistance of individual translators.
3. Dynamo internal drop (with varying load).
4. Resistance of line (conductor) with length in use.
5. Conductor drop (with varying load),
6. Current.

Such a parallel system of distribution may be made clearer by a second hydraulic analogue which appears in Fig. 4. Here each water wheel is assumed to require an amount of water equal to that supplied to each wheel in Fig. 2; hence the total volume of flow or current of water is three times as great in this parallel system as when the same water is used repeatedly by one wheel after another. In Fig. 2 a triple pressure is expended in three equal fractions in but one channel. The mechanical energy necessary in Fig. 4 to maintain a low pressure expended in three different channels is the same as that required in Fig. 2 to maintain three times the pressure expended in one channel. In other words, the product of the three-fold pressure by the unit current required for the series wheels of Fig. 2 is equal to that of the three-fold current by the unit pressure required for the multiple arc wheels of Fig. 4, such pumps and pipes as are necessary for equal economy being assumed.

In the left hand sketch of Fig. 4 the system is shown at rest or in equilibrium, and the water in the various pressure tubes is at the same height L^0. The right hand sketch illustrates the difference in the height of the water in the pressure tubes E, G, F, H, when the system is in operation. This difference is partly due to the fall in pressure which occurs between the opposite ends of the same main pipe; for example, the tube F, at the end of the upper pipe more distant from the pump, shows a lower pressure L^2, than is shown by the tube E at the pump terminal, L^3, and illustrates a fall by friction in the pipe, which is analogous to the fall in the conducting wires of Fig. 3. The difference in the height of the water in the two right hand pressure tubes F, G, is the result of the fall of pressure from L^2 to L^3, which occurs in doing the useful work of turning the water wheels. Any one of the wheels may be stopped by shutting its individual valve or gate, which action corresponds to the breaking of a branch wire in the electrical system of the lower diagram of Fig. 1, by which each translator is turned on or off. In case one wheel is disabled or its individual branch pipe is broken, none of the other wheels are affected. The pump is adapted to give a low pressure but to throw a large volume of water through the pipe which is materially larger than that of Fig. 2, and as is the case in the electrical system of Fig. 1, the action of the pump may be modified so that just the proper pressure is delivered to the wheels at all times.

The multiple arc arrangement has been used for many years. It has been said that it was even utilized by Prof. Moses G. Farmer in an experimental plant operated by him at his home in Salem, Mass., thirty years ago or more. So far as I know, the earliest publication which specifically describes this parallel arrangement was a French patent granted to M. de Khotinsky in 1875. Fig. 5 is a reproduction of two of the drawings of that patent, made more clear by the use of red lines for the positive and blue for the negative conductors and by arrows indicating the direction of the current. The incandescent lamps which are described in this patent are here shown as conducting strips connecting the positive and negative branch wires, and it is evident that the main current sent out by the dynamo divides itself between all the lamps or bridges of the system.

The lower diagram of Fig. 5 shows an arrangement evidently supposed by Khotinsky to be the equivalent of a circuit entirely of wire, in which the earth forms the return. Actual practice has shown that while this use of the earth and its connections is practical for such small currents as are necessary in telephone, telegraph and similar work, there are serious difficulties encountered when the larger currents of electric light and power systems are expected to find their way back to the dynamo without continuous metallic conductors.

Following along the history of development of the multiple arc method of distribution, it is interesting to observe what was proposed in connection with incandescent lamps by Mr. Lane-Fox, an English experimenter, and described in two British patents of 1878. Mr. Lane-Fox seems to have clearly appreciated the idea that in order to properly operate incandescent lamps it was desirable to supply them at all times with a practically constant voltage, and to connect them in multiple arc in order that they might be separately controllable. Thus they would avoid one of the difficulties of a series arrangement, which is that when one lamp is put out or fails to operate, it tends to break the entire circuit and thus stop the operation of all the rest. The idea of Mr. Lane-Fox was to arrange a network of positive conductors on the principle shown by Khotinsky in the second of the diagrams I have reproduced, so as to keep up a steady pressure from all points of these conductors to earth, and thus force through each translator connected from line to ground, such a current as its resistance would allow to pass. If he knew of Khotinsky's arrangements he doubtless appreciated the fact that no provision had there been made for reducing the output of current by the dynamo when lamps were extinguished, because Khotinsky set forth a means of intro-

ducing an equivalent resistance into any circuit whenever its lamp went out. Lane-Fox suggested an automatic regulation of the dynamo by a mechanism which governed the throttle valve of the steam engine which rotated its armature. Foreseeing that there would still be a probability of a lack of uniform pressure throughout a large system, by reason of the drop which would occur even in very large conductors, he also proposed to place at different points through the district, storage batteries which should be charged from the central station during times of small load, and discharged when the requirements of the increasing load had reached a predetermined point. By means of this automatic dynamo regulation and this reinforcement by storage batteries he thus attempted to secure constancy of voltage delivered by the dynamo to the circuit, and uniformity of voltage (at one lamp with relation to other lamps) throughout the entire area. While neither of these methods has proved to be desirable in practice, the disclosure of them at the date of his patents showed a remarkable insight into the subject of electrical distribution.

The next material step in advance was made by Mr. Edison and described by him in patents applied for in February, 1880. One of these was granted in Great Britain in August of the same year, and the corresponding United States patent issued in 1887. Fig. 7 gives diagrammatically an illustration of the connection of several dynamos in multiple arc to a single pair of "omnibus wires" from which the main conductors of the distributing system are taken. In this original arrangement preference was given to vitalizing the magnets of the main generating dynamos by means of a special excitor, the field of which was in its turn excited by a battery. Later experiments showed that the main dynamos might with equal success and greater convenience be excited each by its own armature. To the omnibus wires, or to any portion of the distributing conductors, by means of "pressure wires" coming back to the station, was attached a galvanometer, or a test lamp, or some other means of indicating when the pressure delivered to the system was at a proper standard. One of the great steps taken by Mr. Edison in the perfection of this comprehensive plan by which a greater or less number of dynamos might be connected or disconnected in multiple arc, and might supply through outgoing and return metallic conductors large numbers of translators, was a special construction of the dynamos. The cardinal features which made these dynamos successful for this use were the reduction of the armature resistance to an exceedingly low point with relation to the joint resistance of the translators and the distributing conductors; also the construction of massive magnets, excited to a moderate degree by a small amount of electrical energy, and in this condition capable of a marked increase or decrease of their magnetism by a small variation of the exciting current. It is now clearly understood that the combination of these features constitutes one of the essentials in a system of multiple arc distribution, and this combination, the reduction of the internal resistance and the adoption of magnets of great mass, was for some time recognized as one of the wonders of electrical distribution. Such advances quickly become matters of course, in the rapid advance of such an art.

The regulation of a voltage delivered to the translators by the Edison type of dynamo solved the problem of securing constancy of potential which Lane-Fox had seen to be an essential of multiple arc lighting. The question of relative uniformity had occupied Mr. Edison's attention even earlier than the publication of his comprehensive multiple arc plan. It was clearly outlined as a problem and a clear solution was indicated, in a caveat filed in the United States patent office in August, 1879. The method is outlined in Fig. 8, and consisted in the division of the territory to be covered into fractional consumption circuits, each separately supplied from the central station by conductors having no translators directly connected. Thus in a system so large that it would be impracticable to supply it from one end on account of the size of the conductors necessary to carry a large current over a long distance to many lamps, it became feasible to secure the proper standard of pressure at each of several different points distant from the central station, and to make the drop beyond those points from the nearest to the farthest lamp of each fraction of the consumption circuit, so small that each lamp would give practically the same light as every other. It also became possible to cover large areas by economical amounts of wire, because the drop which occurred between the dynamo and the nearest lamps might be made anything that the engineer might desire, without affecting the relative action of the lamps. In this plan a pair of pressure wires was to be led back from each point or center of distribution and attached to a pressure indicator in the central station.

In this same caveat is disclosed a method of automatic regulation of dynamos for constant potential, which has been found the most reliable and satisfactory for many uses of any system ever proposed. This method consists in equipping each dynamo with two magnet coils, one of which, usually called the primary or initial coil, excites the magnet to a degree merely sufficient to deliver at its brushes the standard of pressure required by the translators before any load is connected to the conductors. This primary coil may be brought from a separate excitor or taken from the brushes of the dynamo itself as a shunt to the outside circuit. The other coil (wound in the same direction) is of coarse wire and connected in series with the translating circuit, so that all the current which is intended for the translators shall pass through it. Thus as a greater amount of current is demanded and sent through this series coil, an increasing magnetism is induced which is sufficient to maintain the voltage practically constant at the translators, by increasing the total E. M. F. to such an extent that the resistance of the armature and of the outside conductors may be overcome and a proper number of volts still be left for normal operation.

(To be continued.)

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(Continued from page 409.)

NOT A CASE OF "RAILWAY SPINE."

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GALION, OHIO.

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Railway surgery without the spinal malinger would be like a ship in mid-ocean bereft of her sails and her rudder. It is a question too, if we would not all lose our jobs if he did not exist; although it is claimed that our employment is a matter designated as being for sweet charity's sake, the court records show that the charity part of it is very much similar to the church donation of a candidate for a political office—sort of a "cast your bread upon the waters" affair.

It has been my privilege to examine and assist in the caring for many cases of spinal injury, and I might add, numerous cases of "supposed spinal injury." Out of the list, I wish to call your attention to four cases that have seemed to me to be very interesting, inasmuch, as they pretty well cover the different forms of injury sustained by the spinal column, namely, fracture without displacement, complicated with severe injury to the soft parts, resulting in recovery; apoplexy of the spinal cord, resulting in death; fracture with displacement, resulting in death; fracture and dislocation, resulting in good recovery.

Case I.—S., aged 19; Irish; scrofulous; has had large abscesses on both sides of the neck; no history of syphilis, either hereditary or acquired; not an employee of the company. Please remember this.

In attempting to step on the front end of a moving switch engine, he misjudged the distance and went under the engine, being rolled between the front trucks until the engine could be stopped, which was probably a distance of thirty feet.

Examination a few minutes after the accident occurred revealed a comminuted fracture of the right forearm, about two inches above the wrist; contusion of inside of left foot; dislocation backward of left hip, with fracture of the acetabulum; the spinous processes of the lumbar vertebra were simply crushed flat, with slight curvature of the spine to the right. The soft parts over the lumbar and upper sacral region were badly contused and fairly bagged with coagulated blood. There was no paralysis of the motor or sensory nerves affecting either the limbs, bladder or rectum. The case progressed nicely. The coagulated blood was taken up, and with the exception of the deformity resulting from the hip injury, he is as well as ever. This would have been a typical case of "railway spine" had not the patient been wholly responsible for the accident.

Case 2.—H. T., aged 36 years, well developed, strictly temperate. July 3, 1880, his carriage was struck from behind by a runaway team, and he was thrown a distance of thirty feet, alighting on his head and shoulders. In company with my father, Dr. H. R. Kelly, I saw the case one hour after the accident occurred. He was conscious, and had been ever since the accident happened; there was a large scalp wound of the posterior part of the head, but no indentation of the bone; complete paralysis of the lower and partial paralysis of the upper extremities. The paralysis of the lower was of both motion and sensation, and was entire; that of the upper was only partial, and was more marked upon the right than upon the left side. There was also very slight paralysis of the intercostals. Failed to find any fracture or displacement of the vertebræ. However, about the seventh cervical there was some tenderness and a slight amount of ecchymosis. He suffered very little pain, in fact all the pain he had was occasioned when his head was considerable elevated. Diagnosticated the case as one of apoplexy of the spinal cord, and the prognosis unfavorable.

Dr. Rosenthal, in his excellent work on "Diseases of the Nervous System," in speaking of apoplexy of the cord says: "Consciousness, speech and the functions of the special senses are frequently unaffected. It is only in abundant hemorrhages of a rapid course, and especially in those of the cervical region, that momentary loss of consciousness occurs. The paraplegic limbs most frequently also lose their sensibility. The anesthesia usually extends upward to the upper half of the back and of the abdominal region. Reflex excitability is preserved or even increased at the beginning, but it rapidly disappears when destruction of the cord occurs in a transverse direction, and especially in the gray matter. The paralysis also involves the sphincters; retention of urine and constipation occur in the beginning, but are soon followed by involuntary evacuations. The muscles which are insensible to mechanical stimulation and to the will, have also lost their electrical contractility. Cline has observed this abolition of muscular excitability upon the very day of the attack. Bed sores and erythema make their appearance. When the fatal termination is delayed, it is caused by progressive extension of the paralysis, by abolition of the vegetative functions, by bed sores, cystitis, pyelitis, and the final febrile exacerbations which accompany these complications. The duration of the disease may be counted by hours, weeks, or even months."

July 4. Found him in about the same condition to-day as yesterday. He has not evacuated his bladder. As he suffered a rupture of the urethra about a year ago, we at once attempted to pass a rubber catheter but failed. We then tried several catheters but were unsuccessful. The stricture had closed down very tightly, and there also seemed to be a curve in the canal through which it was impossible to pass anything. Being afraid of wounding the paralyzed urethra, we desisted and left him until the following morning.

It was now nearly forty-eight hours since his bladder had been emptied, and as we were again unsuccessful in introducing a catheter, we thought it best to resort to aspiration. The needle of a Dieulafoy aspirator was plunged into the bladder about two inches above the symphysis pubis, and about two quarts of urine withdrawn. The operation was an entire success, as not a single bad symptom followed.

We succeeded next day in breaking through the stricture with a No. 8 Van Buren and Keyes' silver sound. After which a catheter was successfully introduced, and his wife,—who, I think, was the best nurse I ever saw—was able to catheterize him from this on. Once in a while the parts would become more relaxed, at which time there was a continuous dribbling of the urine, and at these times his sphincter would become very much relaxed. Although we were very careful with his bedding a large bed sore made its appearance over the sacrum. It was surprising with what rapidity these paralyzed parts sloughed out. He remained in this condition until August 13, when he was taken with a severe chill followed by a high fever. His friends were very anxious for counsel and Dr. Hamilton, of Columbus, was sent for. After carefully examining the patient, he was unable to give any hope for recovery. Patient remained in about the same condition until September 23, when he died. On account of the great sloughing, nearly every one of the lumbar vertebræ and the sacrum were exposed to view. Until the second day before his death, there had been no operation of the bowels for sixteen days.

Necropsy.—Twelve hours after death, in company with Dr. Ridgeway we examined the vertebral column and his spinal cord with the following result: Beginning at the cervical region extending to the first lumbar, we were unable to discover any fracture or displacement of the vertebræ. The membranes were found to be in almost normal condition until we came to the eighth dorsal, where they became very much thickened and hardened. When the membranes were divided and the cord itself exposed, a different state of affairs was found to be present. Beginning with the first dorsal and continuing throughout the whole length of the cord, it was found that there had been complete degeneration from the first to the fifth dorsal, the gray more than the white, and more upon the right than the left side. The cord was so soft that we were compelled to be very careful in handling, lest we might not be able to finish the examination. From the fifth dorsal to the terminus it was very hard and when cut open gave that characteristic sound produced by cutting a scirrhus cancer. About the third or fourth, and also at the seventh dorsal vertebræ, were evidences of a hemorrhage. These spots were distinctly marked. As we were not prepared to examine the specimen microscopically, this was all that we were able to learn from the examination.

Although this case, strictly speaking, was not one of railway injury, it was just such a case as might occur at the time of a collision.

Case 3.—F. M., aged 36 years; German; switchman; moderately good habits. In attempting to get on back end of switch engine, the hand hold pulled out and he went under the engine. The engine was stopped as soon as possible, when it was found necessary to uncouple the tank from the engine to get him out, as he was wedged in back of the fire box. I saw him a few minutes after the accident occurred and found the following symptoms:

Complete paralysis of both sensation and motion below the dorsal region; complained of sharp pains and tingling sensation extending to soles of feet. Examination of spinal column revealed an apparent separated condition between last dorsal and first lumbar. The first lumbar seemed to have a fracture extending through the body, causing some compression from the left side. I use the term, seemed, for the reason that the fracture was not perfectly plain. The last dorsal was dislocated forward. The space intervening between the vertebræ was the width of the thumb. The case progressed from bad to worse, cystitis in an aggravated form starting up about the third week. The limbs became edematous. Ulcers formed over the sacrum, thighs, calves of legs, and the feet themselves almost separated from the body. The man lived for several months, finally dying from sheer exhaustion, after wasting away to a mere skeleton.

A post-mortem examination was not permitted, as the family desired to bring suit for damages, which they afterwards did, recovering something like four thousand dollars.

Case 4.—This case came under our care while I was absent from the city, and I am indebted to Dr. H. R. Kelly for the early history. T. N., aged 23 years; engine-wiper; good habits; formerly farmer. Was down under engine wiping when hostler attempted to move the engine. He was doubled up and wedged under the engine in such a way that it was almost impossible to get him out without jacking up the engine. Examination revealed a dislocation backward of last dorsal vertebræ, the deformity being fully one-half inch. The first lumbar was fractured through the body. There was paralysis of the motors below second lumbar nerve roots, which affected the bladder and rectum to a certain extent. The sensory system seemed to have escaped. It was necessary to use the catheter for about three weeks; very little dribbling of the urine, however, ensued. Great difficulty was experienced in moving the bowels. The knee jerk was present. The case progressed favorably and at the end of several months he was able to get around some. At this time, some ten years since the accident, he is able to work at the carpenter trade. I find pronounced lateral curvature which is so distinct that it is noticeable even when he is dressed for the street. The gait is straddling and labored. The sensations are good, and I am told his only difficulty is in locomotion.

This, gentlemen, is a brief history of four cases that have interested me, and I hope will call forth the experience of many other surgeons. The treatment has been purposely omitted in these cases, as it was the intention to show only the symptoms in certain conditions.

DISCUSSION.

Dr. Milton Jay, of Chicago—Any surgeon who has had much to do with railways for any considerable length of time must have had some injuries that involved the spine. To the railway surgeon the name of "railway spine" is a deep term, and I believe it is no longer used, for the reason that

it is made to cover all injuries of the spine up to traumatic neurasthenia. It is easy enough to give a name, but to determine the exact condition of an injury to the spine is frequently exceedingly difficult, and it requires a high order of skill and of scientific attainments to accurately diagnose spinal injuries in the majority of cases. We can have as many different kinds of spinal injuries as of any other organ of the body. We may have injury or involvement of the posterior or lateral columns of the cord. Nowadays a knowledge of physiology and of the pathologic conditions will enable us to determine whether or not the spinal cord is injured. If there be complete paralysis of any part it is positive evidence that the cord is injured, or else there is compression of the cord either by an effusion of hemorrhage, cerebro-spinal fluid or by compression of bone. I believe it is the duty of railway surgeons, when there is anything like paralysis of the spinal cord, to investigate very closely at the seat of injury, provided that injury has been along the spinal column, to know if the compression consists of a depressed portion of the vertebræ. If so, it is good surgery to elevate the depressed portion; I do not care whether it is the lamina, the transverse or spinous processes. If absolute compression exists, the paralysis can not be relieved until the depressed fragments are elevated. If there is an effusion, tap it. If the spinal cord itself is injured, that ends the case. The spinal cord, when severely injured or torn asunder, presents a condition that we can do nothing for.

As railway surgeons, there is nothing that is probably of so much importance as the medico-legal aspect of spinal injuries. Out of twenty cases of lawsuits brought to recover damages from railway injuries, fifteen of them will claim to have sustained injury to the spine, even if the spinal cord has not been touched. In these cases we should make a careful scrutinizing examination, using the battery with a view to testing the presence of the jerks and reflexes, or the absence of any of them. These examinations should be made as early as possible, and the railway surgeon should be prepared when the trial takes place.

DR. REGER—I infer from what has been said that in those cases in which there is paralysis after injury to the spine that they never fully recover their functions. I had a case two years ago of a young man who finding that he was going to fall, jumped off from the top of a rapidly moving train and fell with such force that it necessitated amputation of the right leg. The bones were driven through the soft parts. Paralysis of the lower extremities accompanied it—I mean paralysis of motion, but not of sensation. Any artificial motion would produce the most agonizing pain in his case, yet he did not appear to move a single toe. There was a perpendicular fracture of the first two lumbar vertebræ, and the displacement was almost the fourth of an inch. I could feel it distinctly. He was a very lean subject, and after the amputation of that limb I supposed the case would go on from bad to worse until he died. I applied a couple of narrow padded boards about four inches long to each side of those vertebræ, so that the weight of his body would press the parts together, and applied a plaster bandage over the parts. About four weeks after that was done he began to move the toes of the left foot. He kept on moving the limb, and continued it for over a year, and finally got entirely well. I suppose in this case it was simply an effusion that pressed upon the cord, and that no part of the bone had touched the cord or its membranes.

DR. JAY—Where was the fracture?

DR. REGER—The first and second lumbar vertebræ.

DR. HARNDEN—I have an idea that this subject is pretty well threshed out, and that I can add very little to what has been said, but I wish simply to call attention to one quotation which I made in my paper, that of Dr. Pope, of a collection and tabulation of 120 cases of spinal injury, in which 99 out of this number, he said, were tinged with the coloring of imposition. I think the subject has been very thoroughly handled of late; it is still engaging the attention of the surgical world, and I believe the more we study this subject the more will it be demonstrated that this element of imposition or fraud is a powerful factor in these cases, and that we should as railway surgeons study to eliminate this element as far as possible. During the war, through some method or process, I know not what, we killed off and buried out of sight the whole element called general debility. We have not heard of it in recent years, and I think now through an evolutionary process we are going to kill off the neurosis called "railway spine." Probably Erichsen never did a more foolish thing, or one which will dim the luster of his renown in the ages to come, so much as the one thing of inventing the term "railway spine." No physician uses it by itself today. I think, beyond any question, that the railways will be greatly benefited through the efforts that have been made by railway surgeons during the past three or four years to illuminate this mysterious subject. I think it is the common experience of the medical gentlemen present to meet with this bugbear in their private practice. A man or woman falls down on a slippery sidewalk, and has prospective damages in view against the corporation of the city. Immediately follow the symptoms, which are developed as a general thing by auto- or hypnotic suggestion or otherwise. The patient will complain of pain in the back, which is the primary symptom usually met with, and although he does not strain the ligamentous attachments of the spinal column or at any rate, the muscles of the back, the lumbar muscles, or otherwise, yet that symptom is of importance, developing into something tangible. It is our duty in railway injuries, especially as surgeons in attendance upon these cases, to be on the alert, to be cautious and quick to detect the incipient symptoms of this "spook."

DR. SCOTT—This paper should have brought out, I think, more discussion in regard to genuine injuries of the spine, and I only wish I were better prepared to discuss it. We must not lose sight of the fact that we do have genuine injuries and serious ones of the spine; that many of them are fatal within a short time. Many of them produce permanent injury, and the Doctor has given us reports of some cases of that character. I have found in my State among railway surgeons that there is a tendency, whenever they run across an injury of the spine, to throw it off and class it among those cases which have been under discussion so much in railway organizations during recent years, and in many instances overlook actual injury to the spinal column or to the spinal cord. We must remember that injuries to the bones of the spinal column, injuries to the ligaments, muscles and membrane are not uncommon, and I think that we should certainly give them due attention. I remember a case in point that I had a little over a year ago, of a man who was struck in the spine in the center of the dorsal region by the drive rod of an engine. The engine was running backward at the time. I thought from appearances he was suffering from a contusion, but shortly after paralysis developed, very much as that described in some cases of concussion of the spine. I was inclined to think, on account of some remarks the man had made, that he was assuming these symptoms of paralysis, but I afterward found that he was not doing so. He finally developed spondylitis. I was fully convinced that here was a genuine injury. I believe such a mistake is not uncommon among railway surgeons. We should remember that in these genuine injuries of the spine the prognosis is not always grave. A man will recover every now and then from a fracture of the vertebræ. They not infrequently recover from the effects of hemorrhage within the spinal canal provided the hemorrhage is not within the spinal cord itself. I do not believe there are any authenticated reports of cases of hemorrhage within the spinal cord where recovery has followed, that is, where it is within the tissues of the spinal cord; but from hemorrhage and effusions within the spinal canal between any of the membranes, we have every reason to believe that recovery takes place and it is not infrequent. I can recall two or three instances of complete paraplegia where recovery resulted, and where I had reason to think the paralysis was due either to hemorrhage or to effusion.

(To be continued.)

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SATURDAY, MARCH 23, 1895.

AMERICAN MEDICAL ASSOCIATION.

In an organization like the AMERICAN MEDICAL ASSOCIATION, some one is always disturbed. A certain number find great fault with the JOURNAL, others are alarmed at what they call the political ring rule, and others think the ASSOCIATION ethics is a most serious rock of offense. Personal criticism of its officers and managers, is common ground for the display of disappointments and all the various slights and offenses, real and imaginary, that may appear. This is the friction that is a part of all organized movements, and indicates growth and progress which is always very promising for the future. The mutual admiration societies who never differ, who have no conflict of opinions on any questions, rarely accomplish anything for scientific medicine. Societies in which there is no struggle to become leaders or to direct its interests have not much influence in the world. In all live aggressive organizations there is a struggle, a restless movement and constant conflict, in which personalities clash and differ widely, but such differences are simply different points of view, which vary incessantly. This is no reflection on the honesty of the men who may be on opposite sides at different times, but evidence of their independence in thought and act.

To refuse to join the AMERICAN MEDICAL ASSOCIATION because of its ethics or want of ethics, or politics, or rings, or dislike of some one prominent in its management is childishness. The ASSOCIATION is not the product of any ring, or political or ethical standard of faith; it is the representation of American medical science; and of its progress and development. This is not to be measured and marked off from year to year, but to be estimated as the results of years of history. The apparent ring rule of one year disappears the next, the battle over some question of ethics or rule of organization dies out the year following, or appears in some other question and so on, year after year, growing less and less personal, and more and more as a display of restless pent up energies.

The ASSOCIATION goes steadily on, and the solid conservative rank and file keep along undisturbed. Revolutions and sharp innovations are voted down, until the time comes for their free acceptance and indorsement, as the full concensus of opinion by the profession at large. Ambitious men may form rings for their personal advancement, but the soil is unfertile, and the yearly changes of the ASSOCIATION meetings bring new surroundings and new circumstances that are fatal to long success.

This is common every-day history of many other associations and organizations, and even of the church. To refuse to join an association because its members differ with each other in minor matters is weakness, To join and take active part, and defend convictions on all matters where differences exist, is manly and scientific. The science of medicine is not advanced and the great truths of nature evolved, by pharisaic criticism and refusal to take part in the struggle that every live society is passing through.

The AMERICAN MEDICAL ASSOCIATION is *National*, and belongs to the entire profession over all the country. If it is faulty in its management, its members are the real sinners. They are the powers who can control; they can unite and regulate any wrong that may exist; the officers and managers are but servants doing their bidding. Sneers and criticisms and refusals to join the ASSOCIATION because of this or that, are absurd and unreasonable.

The ASSOCIATION will go on, and its JOURNAL will appear regularly, entirely irrespective of the opinion or life of any individual. It is organized for the benefit of every medical man, and through its JOURNAL to bring him in touch with every advance of science, and with the work of the great teachers of the world. Its work and influence belongs to all alike; the practical country doctor, and the theoretical professor meet on the same level, and have equal voice in the control of the ASSOCIATION. It should be a source of pride to every physician that he belongs to the NATIONAL ASSOCIATION, and has a part in the growth and progress of American medicine which is destined at a not very distant period to lead all the world. It should be both a pleasure and duty to attend the meetings, and take part in the many questions which are presented in both the sections and general meetings. The larger and more widely extended its membership the more valuable its meetings become. It is from the opinions of physicians from widely differing sections of the country, that

great truths are evolved. The discussions which follow the reading of papers often contain far more truth and practical suggestion than elaborate text-book chapters. Many of the papers read are the most advanced studies of original workers, far beyond the teachings of the last book.

This ASSOCIATION was not established for any one class of men; it is for all, and its central purpose is to gather and organize the active workers in every department of medicine, and to create interest and sympathy in every new advance of science. It can not represent the views of any one man; it must reflect the opinions of the entire profession. It is a tribunal to which any member may bring his opinions for test and comparison, and may sit in judgment on the views of others. It is literally the final court of resort for medical men, and should be most enthusiastically supported by every practical student of medicine.

SUNLIGHT AND FRESH AIR.

So much attention is just now being paid to the prevention and restriction of tuberculosis, and so sweeping and radical are the measures advocated by those who would "stamp out" the disease at once, that it may be well to pause and try to find out "where we are at." The application of the tuberculin test to every bull, steer, cow, calf and heifer between the Atlantic and the Pacific oceans, as is urged by some enthusiasts, may prove to be no more necessary than the proposed notification of every case of tuberculosis and its suppressive or preventive treatment, as though it were as bad as leprosy or smallpox or worse than syphilis. Indeed it is questionable, as has already been intimated in these columns,[1] whether the wholesale tuberculin test may not be as mischievous in its results as the evil it serves to develop—whether it may not fan into flame a general tuberculosis from a latent spark which otherwise might have remained harmless.

Much good, however, is undoubtedly resulting from the attention given to the etiology of the disease and its infectious character, and among the most interesting and important of recent results, from a practical standpoint, are those accruing from the researches of DRS. SHERIDAN DELAPIN and ARTHUR RANSOME of Owens College, Manchester, Eng., the former Professor of Pathology, the latter Professor of Public Health in that institution. These gentlemen have for some time been pursuing an inquiry into the value of the municipal methods employed for disinfecting rooms in which tuberculous patients have lived, as well as into other methods of disinfection and the influence of certain natural agents on the virulence of the *B. tuberculosis hominis*. One of their reports was presented to the Scientific Grants Committee of the British Medical Association shortly before the last annual meeting of the Association, but has only recently been published. It embraces fifteen elaborate tables, with illustrations, diagrams and text, dealing with the virulence of fresh human tuberculous sputum, the virulence of recent cultivations of the human and avian tubercle bacilli, the effect of drying on the virulence of pure cultures of the same, the action of euchlorin on tuberculous sputum and on cultures of the bacillus, the effect of sulphurous acid, of the soluble products of combustion, of chlorinated lime solutions, of ventilation and of sunlight on the same.[2]

Aside from the numerous experiments which have been made for the purpose of testing the virulence of the tuberculous products used in the experiments, and the influence of collateral factors, such as dryness, ventilation, heat, etc., the investigators conclude that:

1. The disinfection of rooms which have been contaminated with tuberculous products can not be obtained by means of the fumigation methods such as are generally used at present. Sulphurous acid, chlorin and euchlorin, as used under supervision by experienced municipal disinfectors, have proved practically useless. This only confirms the results obtained by KOCH and his pupils in the case of a number of other organisms.

2. The only other method of disinfection which seemed to promise more satisfactory results was the direct application of a solution of chlorinated lime to the walls to be disinfected. This method has given so far satisfactory results, but is attended with discomfort on the part of those who have to carry out the disinfection. It must be remembered that the experiments of SCHILL and FISCHER are unfavorable to the use of perchlorid of mercury.

3. Light is, in the case of the tubercle bacillus, as it has been proved by several observers to be in the case of other organisms, the most important natural disinfecting agent.

The bases of this last conclusion are to be found in Tables XIII—"Effect of Sunlight on the Virulence of Tuberculous Sputum," and XIV—"Effect of Sunlight on Pure Cultivations of the *Bacillus Tuberculosis Hominis*." In the former are given the results of specimens of four different sputa used in experiments on nine guinea pigs, from one-eighth to one c.cm., being injected subcutaneously into the tissue of the leg and into the peritoneum; all the sputa were proved to be infectious in control experiments; the specimens injected were previously exposed to sunlight and air for varying periods—the maximum being during "three bright afternoons"; one of the animals was killed and examined on the fourth, two on the seventh, two on the twenty-second, one on the thirty-seventh, one on the forty-sixth, one on the eightieth and one on the eighty-sixth day after injection. In none was any trace of tuberculosis found. Table XIV gives the results of similar experiments with a pure culture of the

[1] JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, p. 885.

[2] For these tables, etc., see British Medical Journal, Feb. 16, 1895.

bacillus—four guinea pigs being inoculated each with one-half c.mm., of a culture proved to be virulent by control experiments; the culture injected had been previously exposed to sunlight for a maximum period of eighteen and a half radiant hours; the first pig was killed and examined on the forty-third day after inoculation, the remaining ones on the seventy-eighth, one hundred and fortieth and one hundred and fiftieth days. In none was any trace of tuberculosis found.

Do not the results of these painstaking and elaborate investigations tend to show that the radical measures of chemic disinfection, of segregation, of branding and labeling the unfortunate tuberculose are wholly uncalled for or worse? Do they not again demonstrate the sufficiency of the great natural agents of disinfection—sunlight and fresh air? And may not all necessary prophylactic measures in the family of a consumptive patient be safely left to the attending physician, without the intervention of the health officer or municipal disinfector?

A PITFALL FOR THE PROFESSION.

One of the most largely attended meetings of the New York County Medical Society was held last week at the Academy of Medicine in New York city in response to the following call:

WHEREAS, A number of instances have occurred in this city where reputable members of this Society have been arrested for complicity in malpractice cases without even the shadow of a reason for such action on the part of the police; therefore, we, the undersigned, respectfully request you to call a special meeting of the Society for the purpose of ascertaining the rights and privileges of physicians who may be called to attend cases of abortion, etc.

The immediate occasion of this call was the recent arrest of two reputable physicians, members of the Society, who had been summoned to a patient in the house of a midwife, and to whom the patient represented that she was a widow and denied absolutely that any operation had been performed on her or any medicine given to her. The physicians ordered her taken to a hospital, having previously sent for a coroner, who could not be found before it was necessary to remove the woman. She died in the hospital after making a full confession, incriminating the midwife and completely exonerating the physicians; notwithstanding which they were arrested by the police and taken before the coroner, who refused to hear them, and was about to hold them in $5,000 bail each when, on the intervention of a coroner's physician who knew them, they were released on their own recognizances. The jury, made up of medical men, returned a verdict that the attending physicians had acted in every respect in accordance with their duty.

DR. E. H. GRANDIN, President of the Society, on calling the meeting to order, said:

"An indignity has been imposed upon the medical profession by the police, and their action in a recent case, which may form a precedent unless a protest is made. We find ourselves between the horns of a dilemma. When called to the bedside of a dying woman, if we do not respond we lay ourselves open to the imputation of inhumanity. If we do respond and find the woman in danger from what appears to be the result of a criminal operation, we must take one of two courses: Either report the matter to the police and subject ourselves to the possibility of a libel suit, or keep it secret and, in the event of the death of the patient, run the risk of arrest. We are here to protest against the idea that the presence of a medical man at the bedside of a woman suffering from miscarriage is *ipso facto* evidence that he has committed a crime in the matter. It is the midwives and notorious abortionists who, under the guise of specialists, commit these crimes, for which they are so often indicted but so seldom punished. This crime is on the increase. Are the officers of the law, by their laxity where they should be most active, responsible for this state of affairs? This city should be made too hot to hold abortionists."

In the discussion which followed, DRS. JACOBI, MARKS, REED, IRWIN, VAN RANDOHR, TUTTLE, HART and others, including the coroner himself, a DR. HOEBER, participated—the latter gentleman announcing and attempting to defend the startling proposition that a physician is bound to reveal the secrets of the sick room where he may suspect crime has been committed. After a somewhat exciting session, a resolution was adopted instructing the counsel of the Society to furnish an opinion on the subject-matter of the call as therein recited, and a resolution, offered by DR. MICHAELMAS, denouncing the arrest of the physicians as unjustifiable, declaring that abortion is on the increase, and calling for legislation making it a criminal offense for any person but an M.D. to practice midwifery, was referred to a committee.

It is to be hoped that the Society will not let the matter rest in this stage. It is notorious that criminal abortion is rife in every large city; that the premises of too many midwives are simply slaughter-houses; and that it is the common practice of these hell-hags to shunt their dying victims off on to the nearest physician whenever it can be done. No general practitioner who does obstetric work in any large city of the country is safe in taking an emergency case without pursuing such inquiry as to make him subject to the charge of being inhuman and cold-blooded. The practice of midwifery should be, as DR. MICHAELMAS suggests, confined by criminal statute to regularly graduated physicians, and the abortionist-midwife be made an outlaw.

THE forty-sixth annual session of the AMERICAN MEDICAL ASSOCIATION will be held in Baltimore, Md., on Tuesday, Wednesday, Thursday and Friday, May 7, 8, 9 and 10, commencing on Tuesday, at 10 A.M.

THE NOMENCLATURE AND CLASSIFICATION OF DISEASES.

SURGEON-GENERAL STERNBERG has issued a revision of the nomenclature and classification of diseases in use in the Medical Department of the Army. Up to this time the official classification was practically that of the College of Physicians of England, and included many divisions and subdivisions such as zymotic, miasmatic, entbetic, zoögenous, etc., that belong to a past era in the progress of medical knowledge. The new classification is therefore a step in advance taken at the instance of clinical as well as etiologic considerations. The nomenclature used is simple and as free as possible from technicalities. Developmental diseases and the refractive errors of the eye find no place on the new list, as men with such disabilities should not be accepted for service. The dietetic class, which included alcoholism and results, delirium tremens, drug habit and scorbutus has been broken up, and scurvy placed among the general diseases of nutrition with acute alcoholism, chronic alcoholism, delirium tremens and chronic narcotic poisoning among diseases of the nervous system. The class of parasitic diseases is also omitted, scabies being placed among local infections of the skin, and trichinosis among infections. Rheumatic fever, carcinoma and sarcoma appear among the general infections. Their right to this position has not been established satisfactorily, but it is strongly indicated by the tendencies of recent etiologic studies. In order not to dislocate certain local infections too abruptly from their old associations they are entered under "structural and functional diseases of organs," as well as under "infections," so that in consolidating the statistics they may be thrown in either direction as desired by the statistician. Among many minor changes, hernia is placed with accidents and injuries where it properly belongs, instead of being included, as heretofore, among diseases of the digestive system. We will print the circular containing the list in this issue of the JOURNAL.

DECISION REGARDING THE QUARANTINING POWERS OF BOARDS OF HEALTH.

The Health Commissioner of Brooklyn, DR. Z. T. EMERY, has obtained through counsel an important reversal of a former decision that had the effect of abrogating the powers of health officers to practice quarantine for the purpose of stamping out smallpox and the like. This reversed decision is a virtually unanimous opinion of the three judges sitting in general term of the Supreme Court of New York, and can not fail to be far-reaching in its influence in all States where the legal system resembles that of New York. This probably includes not less than one-half of the United States. The judges sitting in this term were JUDGES DYKMAN, PRATT and CULLEN. The decision was signed by the former two; the last named did not sign, for he was not present at all the hearings.

The reversal asserts that the Commissioner of Health has the right to order that persons may be quarantined for the protection of the health of the community, where a proclamation has been duly made that the public health is endangered by reason of impending pestilential disease, that it is the duty of the Board of Health to exercise a proper and vigilant control of persons and things which, from any cause, are liable to communicate contagion. The question of compulsory vaccination was not at issue in this case, and the reversal does not affirm or deny the right to compel that procedure in a direct way. The following are the closing paragraphs of the decision, freed from the technical legal references to authorities, enactments, etc.:

"These relators fell under the control of the Board of Health; they came to the city from infected places, and they were liable to communicate contagion; they were, therefore, proper subjects for isolation and they were quarantined and detained in their premises. That isolation and detention was clearly within the scope and powers and duties of the Board, and that is all it did. The Board did not require the relators to be vaccinated, and that seems to be the error into which the relators have fallen. They seem to assume that the Board of Health intended to compel them to be vaccinated, but the acts of the Board admit of no such construction. There was neither coercion nor compulsion. They were isolated and deprived of their freedom because they had been exposed to smallpox and were liable to be seized therewith, and by communication with others, to spread the disease. That was a legitimate exercise of the power and authority vested in the Board by statute, and it was unnecessary to prescribe any conditions upon which the relators could terminate their isolation; that was done entirely for their benefit and for no other purpose. If they availed themselves of the privileges tendered to them, their acceptance would terminate their quarantine, and their refusal would leave them in isolation until July 1, 1894, the time mentioned in the mayor's proclamation. They refused the condition and instituted this proceeding. The prevention of smallpox is of such paramount importance as to justify all reasonable means for its accomplishment. In the age of the world we live in, security is gained from the awful pestilence of smallpox by reason of the practice of vaccination as a preventive. Its efficacy has been recognized by physicians of all schools for nearly a century. DR. JENNER, its discoverer, was immortalized by its introduction. Vaccination was accepted and practiced by the entire civilized world within six years from the time of its first discovery, and it has been in universal use from that time until the present. It is stated in the return, and the statement is uncontradicted, that it is a well established scientific fact that vaccination is a preventive of smallpox in the person vaccinated, and it has been for many years demonstrated that thorough vaccination of persons in crowded centers is indispensable to the prevention of epidemic smallpox.

"This statement, as we have narrated, is in accord with the advanced thought of the age in which we live, and it receives our concurrence. We have decided at the present term of this court that vaccination may be required as a condition precedent to the admission of children to the common schools of the City of Brooklyn.

"The propriety and wisdom of the course pursued by the Board is beyond criticism. Its acts have all been within the lines of statutory authority, and they have been discreet and in evident good faith in the presence of an impending pestilential danger."

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THE AMERICAN LANCET.

After twenty-four years' service in medical journalism, the veteran editor of the *American Lancet*, DR. LEARTUS CONNOR has retired from responsible editorship, and the publisher announces that the publication will cease from and after the issue of the March number.

Under the guidance of DR. CONNOR, the *Lancet* has been clean, bright, scholarly and fearless, and the tribute paid him by MR. GEORGE S. DAVIS, the publisher, is only a just tribute to his worth and merit. In his valedictory the editor says:

"The *American Lancet* has done what it could to promote the advancement of the profession along the highest lines coincidently with the marvelous changes in and out of the profession of medicine during the past twenty-four years. It has encouraged young men to acquire the art of writing, and old men to continue in the practice of this art, to the end that more facts and experiences of value might be placed upon the written record of the profession. It has encouraged medical society work and sought to multiply medical society workers. It has never neglected to encourage every effort for sound medical education along such lines as experience has shown to be the wisest. To repress the false and develop the true in all directions of the science and art of medicine and among medical workers, has been its constant aim."

CORRESPONDENCE.

WILMORE, CAMBRIA CO., PA., March 19, 1895.

To the Editor:—Can any of the readers of the JOURNAL inform me of the name of the town in the State of Maine where Professor Usher Parsons was born (he being the first Vice-President of the AMERICAN MEDICAL ASSOCIATION), and if he was a descendant from Joseph (4th) Parsons and Elizabeth (Usher) Parsons, of Braintree, Mass?

There have been many of the Parsons family who have received the given name of Usher. Perhaps the youngest may be Dr. Usher Irving Parsons, of Council Bluffs, Iowa, who is now Professor of Physiology in the medical school of that city.

And can any one inform me about Dr. Hall Jackson, of Portsmouth, N. H., who must have been in practice during the latter part of the last century?

IRVING C. BLAISDELL, M.D.

ANSWER:—Dr. Usher Parsons was born in Alfred, York County, Maine, in 1788. For a notice of Dr. Parsons see Trans. Am. Med. Asso., Vol. XXI, p. 430. There is no notice of him in Thatcher, Williams, Gross, Atkinson or Stone.

PUBLIC HEALTH.

Praiseworthy Action of a Railway Company.—A diphtheria corpse was recently shipped from Hammond, Ind., to Lima, Ohio, and thence to Spencerville, Ohio, where the body was interred. The matter was brought to the attention of the Chicago & Lake Erie Railway Company, over which line the shipment was made, and on a report from the health authorities the superintendent suspended the conductor, train and station baggage-masters who assisted in handling the body. It was found that the shipment had been made as indicated and the rules of the State Board of Health and of the company violated, because the father of the child was connected in some way with the road.

Demography of San Luis Potosi.—The JOURNAL is in receipt of the current series of weekly bulletins, *Demografico-Meteorologico*, of the city of San Luis Potosi, Mexico, compiled under the direction of the Inspector General, Dr. J. E. Monjaras. The population of the city, by the census of December, 1891, is 68,401, composed of 31,919 males, 36,482 females; under 15 years of age, 24,855, between 15 and 60 years 41,444, over 60 years, 2,102. The deaths during the first seven weeks of 1895 were 373—an annual mortality rate of 40.5 per 1000. The *Boletin* makes no comment upon this high death rate which is in excess of the natality rate for the same period, during which only 362 births were reported—an annual rate of 39.2 per 1000.

Sterilization of Milk.—Rodet thus reviews in the *Bulletin Medical de Paris* the three principal methods of sterilizing milk by heat: 1, sterilization, properly so called, by a temperature of 110 to 120 degrees C.; this is the only way to kill all the germs and keep the milk for a long time; 2, pasteurization, or heating to the minimum of 75 to 80 degrees, which, while not affecting the most resistant microbic forms, nevertheless inhibits their pathogenic activity and retards the fermentation of milk; 2, the method between these two, of employing about 100 degrees of heat, is the one commonly used and its power of sterilization depends on the length of time it is carried on. Ebullition of the milk, even if short, acts powerfully against the pathogenic microbes and against the acid ferments. Among the drawbacks to sterilization is the brown color which some milk assumes and which offends the eye of the consumer, as well as changes its taste. These changes are of little importance compared with the pellicle which forms on the surface of milk boiled while exposed to the air. This imprisons a certain quantity of cream and hence affects the nutritive value of the milk. Its formation may be nearly entirely avoided by boiling in bottles in steam or boiling water, as in Soxhlet's method. According to MM. Budin and Rodet the milk prepared according to the latter method possesses a value for nurslings at least equal to raw milk. For milk consumed in cities, the boiled or sterilized method possesses a greater superiority. Contrary to the opinion of certain authors, who attribute a less degree of nutritive value to boiled or sterilized milk on account of its greater digestibility, Rodet thinks that the difference, if any exists, is very slight.

Prevailing Morbidity.—The equable temperature of the past week, although below the normal in some regions, has favorably affected the seasonal diseases. Diphtheria in the larger cities has undergone a notable diminution in prevalence, but, as is common, its ravages in the rural districts and smaller towns are reported to be quite severe. The enthusiastic advocates of the antitoxin treatment still continue to attribute the decline to the new remedy; Dr. Herman Biggs, of the New York City Board of Health, is quoted as ascribing a reduction of 40 per cent. in the diphtheria mortality in that city to this cause.——The smallpox situation is substantially as reported in last week's issue of the JOURNAL. Sporadic cases continue to occur in many of the Northern States—St. Paul, Minn.; New Haven, Conn.—among the Yale students—at some points in Ohio and elsewhere; but its increase is mainly in the region south of the Ohio River. The reports are conflicting and, like the "fever and ague" of early days, there is none in the town making the report but in the neighboring town or some other locality, the disease is "raging." Quarantines continue to impede travel throughout the Valley States. Dr. Wingate, Secretary of the Wisconsin State Board of Health, reports, March 18, total number of cases on hand in Milwaukee, 18; in hospital 7, in homes 11; he also reports 5 cases at Sparta, in Monroe County. In Chicago, the Health Commissioner, Dr. Reynolds, is congratulating the community on its escape from the usual second year of the epidemic—citing the following comparative figures: In the last epidemic, 1881–83, there were 1,180 deaths during its first year out of a population of 540,000; in 1894, the first year of this epidemic, there were 1,033 deaths among three times the population; in January,

1882, there were 345 deaths; January, 1895, 55 deaths; February, 1882, 281 deaths; February, 1895, 30 deaths; first twenty days of March, 1882, 171 deaths; first twenty days of March, 1895, 19 deaths. He claims that the outbreak is substantially at an end.——Influenza fails to make any appreciable impress on the general death rate in this country, although its influence on acute lung diseases is quite marked. ——What is probably an outbreak of epidemic cerebro-spinal meningitis is reported to be prevailing as a "fearful pestilence" in Floyd County, Kentucky, some fifty deaths being already reported among its sparse population. Dr. B. M. Smack, of Oakland, Ky., has been sent into the region to investigate, and his preliminary report to Dr. McCormack, Secretary of the State Board of Health, confirms the diagnosis.

In Europe, influenza continues to attract attention; the disease does not subside so rapidly as was anticipated, and the official figures of the last week show an increase in London, where the number of deaths from the malady for the first half of the month was 769; this exceeds the total for the entire year of 1894. The death rate of the city for this period reached 41 in the thousand—one of the highest points ever known. In Scotland the death rate in February was 45 per cent. higher than any previous February rate since records were kept. A special cable dispatch to the New York *Sun* says that "the influenza is peculiarly malignant in certain places. Three sisters died of the disease at Rochester this week, and it was necessary to postpone the funeral because all the mourners were prostrated by the same malady." From Berlin, reports indicate no decrease in the spread of the epidemic; there have been since January 1, 730 deaths from this cause in Berlin alone.——An outbreak of what is, apparently, the human form of the foot-and-mouth disease of cattle has appeared among the inhabitants of Schönberg, a suburb of Berlin, and physicians are said to be apprehensive of its spread throughout Europe. Dr. Thorne Thorne was the first to establish the transmissibility of this zoögenous disease to the human family through the milk of diseased cows and its transmissibility by direct contact is well-known to veterinary surgeons. It is hardly possible, however, that the cattle of Europe are so generally affected with the disease as to cause any wide spread of it in human beings. Professor Virchow and a committee of the Berlin Medical Society are investigating the local outbreak.

Health Reports.—The Supervising Surgeon-General of the Marine-Hospital Service has received the following health reports:

SMALLPOX—UNITED STATES.

Arkansas: Little Rock, February 1 to March 8, 82 cases, 14 deaths; Hollywood, Clark County, March 8, 1 case, 1 death.

Louisiana: New Orleans, March 2 to 9, 2 cases.

Michigan: March 1 to 9, smallpox reported at Detroit, Grand Rapids, Highland Park and Three Rivers; one case of suspected smallpox at Ypsilanti.

Ohio: Cincinnati, March 8, 12 cases. March 8 to 15, 3 cases, 1 death; Lima, March 1 to 8, 1 case, 1 death.

Illinois: Cairo, March 11, 1 case.

Tennessee: Memphis, March 13, 1 case, 1 suspected case.

Texas: Fort Worth, March 2 to 9, 4 cases; Marshall, March 13, 1 case.

Wisconsin: Dover, March 2 to 9, 4 cases; Milwaukee, March 2 to 9, 7 cases, 2 deaths.

SMALLPOX—FOREIGN.

(Reported by U. S. Consuls).

Arabia: Aden, January 26 to February 9, 2 cases.

Belgium: Brussels, February 16 to 23, 1 death.

Holland: Rotterdam, February 23 to March 2, 13 cases, 3 deaths.

Ireland: Dublin, February 16 to March 2, 166 cases, 11 deaths.

Gibraltar: February 17 to 24, 1 case.

India: Calcutta, January 26 to February 2, 43 deaths.

Italy: Naples, February 16 to 23, 2 cases, 2 deaths.

England: Leeds, February 23 to March 2, 1 case; Liverpool, February 23 to March 2, 3 cases 1 death; London, February 16 to 23, 75 cases, 1 death.

Russia: Moscow, February 9 to 16, 2 cases 2 deaths.

Scotland: Edinburgh, February 16 to 23, 1 case, 2 deaths: Glasgow, February 16 to 23, 40 cases.

CHOLERA.

Ceylon: Colombo, January 26 to February 2, 8 cases, 8 deaths.

India: Calcutta, January 26 to February 2, 28 deaths; Madras, February 2 to 8, 4 deaths.

Austria-Hungary: Galicia, (4 political districts) February 4 to 10, 11 cases, 7 deaths.

Russia: Petrikov Gov't., January 13 to 19, 2 cases, no deaths; Radow Gov't., January 6 to 19, 5 cases, 4 deaths; Suwalki Gov't., January 13 to 19, 8 cases, 7 deaths; Kurland Gov't., December 30 to January 12, 27 cases, 14 deaths; Podolia Gov't., January 13 to 19, 69 cases 37 deaths; Taurien Gov't., January 6 to 12, 26 cases, 19 deaths; Minsk Gov't., January 6 to 12, 5 cases, 3 deaths; Kursk Gov't., January 6 to 12, 3 cases, 3 deaths; Saratov Gov't., January 6 to 12, 3 cases, 1 death.

Turkey: Constantinople, January 29 to February 4, 46 cases, 22 deaths.

YELLOW FEVER.

Ecuador: Guayaquil, February 15 to 22, 2 deaths. The Consul-General at Guayaquil writes that "of the seven or eight men of ships' crews dying within the last ten days, none are reported as having died of yellow fever, while the common apprehension is that they all died of that pest. The ports of Peru are quarantined against Guayaquil."

Cuba: Havana, month of February, 4 deaths; March 1 to 7, 5 cases.

Under date of Jan. 18, 1895, the United States Consul at Amoy, China, reports the following relative to the existence of the plague in Amoy: "Several times last summer during the prevalence of the plague in Hong Kong and Canton, rumors came to me that isolated cases were occurring in Amoy. In every instance, however, prompt inquiry of the medical officers of the port, Dr. MacDougall and his assistant, Dr. Wingate, elicited the assurance that no cases of the plague were encountered by them, either in their general practice or in their Chinese hospital, and besides they had kept out a standing offer of a considerable reward for any such diagnosed by a foreign surgeon. But on January 5, I received official notification of the existence of the plague in Amoy, a limited number of cases having occurred. Some of these cases speedily terminated fatally; but the arrival of a Cantonese doctor was followed by good results in saving a large proportion of the patients; and in fact it is now said there are now no cases left in the town. I understand that the disease has made its appearence in the interior towns and villages to the north and west of this port, but of this I am wholly without reliable information."

The following letter has been received from Acting Assistant Surgeon L. P. Gibson, M.-H. S., at Little Rock, relative to smallpox at Hot Springs and vicinity:

"I have the honor to report as follows concerning smallpox in this State: At Hot Springs, the Secretary of the State Board of Health reports that there have been 115 cases and 25 deaths up to date. At Malvern, 4 cases, no deaths; at Donaldson, 4 cases, no deaths; At Hollywood, 1 case, no deaths. The disease has appeared at Brinkly, Ark., the crossing of the L. R. & Memphis with the St. Louis & Northwestern R'y. There are 4 cases with no deaths thus far. The large increase of cases at Hot Springs for the week does not represent the actual number of new cases for that period. A number of them are cases that existed before, but were not discovered. All the cases in this State are traceable to the same source of contagion, Hot Springs.

"Little Rock, Ark., March 16, 1895."

ADDITIONAL REPORT OF SMALLPOX.

England: London, February 23 to March 2, 68 cases, 1 death.

Scotland: Edinburgh, February 23 to March 2, 9 cases, 2 deaths.

Russia: St. Petersburg, February 9 to 16, 9 cases, 3 deaths.

ADDITIONAL REPORT OF SMALLPOX IN UNITED STATES.

Ohio: Columbus, March 9 to 16, 1 case.

BOOK NOTICES.

Suggestions to Hospital and Asylum Visitors. By JOHN S. BILLINGS, M.D., and HENRY M. HURD, M.D., with an introduction by S. WEIR MITCHELL, M.D. Philadelphia: J. B. Lippincott Co. 1895. Price 50c.

An excellent book of conundrums which hospital visitors should propound to themselves on visiting hospitals, the answers to which are to be found in the conditions as they exist. Notwithstanding that the book has been compressed

into 48 pages, it seems to cover all the points necessary for hospital inspection. The book should be read by hospital stewards, hospital matrons, nurses, and internes, as well as by hospital visitors.

A Manual of Bandaging, adapted for self-instruction. By C. HENRI LEONARD, A.M., M.D. Professor of the Medical and Surgical Diseases of Women, and Clinical Gynecology in the Detroit College of Medicine. Sixth edition, with 139 engravings. Cloth, octavo, 189 pages. Detroit, Mich.: The Illustrated Medical Journal Co., Publishers. Price, $1.50.

This is the sixth edition of this book, and is well worth examination and a place in one's library. The explanatory cuts are numerous, and the text lucid.

The Anatomy of the Nasal Cavity and its Accessory Sinuses. An Atlas for Practitioners and Students. By DR. A. ONODI. Translated from the Second Edition by ST. CLAIR THOMPSON, M.D., London, F.R.C.S. London: H. K. Lewis. 1895. Small quarto.

This book consists of a set of plates which show the topographical relations of the nasal cavity and its accessory sinuses. They represent sections made in different directions and photographic reproductions. The anatomic preparations were made in the laboratories of Mihalkovics and von Thanhoffer in Buda-Pesth. The plates from 1 to 14 are extremely valuable. The rhinologists can scarcely afford to be without a copy of these exquisite plates. They are very instructive for general practitioners and students, as well as for specialists. We can not speak for plates Nos. 15 and 16, as by some inadvertence they have been omitted from the copy sent to the reviewer.

A New Surgical Work. A System of Surgery, edited by FREDERIC S. DENNIS, M.D., and JOHN S. BILLINGS, M.D.

This work is announced by Lea Brothers & Co. as shortly to appear, in three imperial octavo volumes. The list of contributors embraces the names of W. T. Bull, Charles McBurney, and Robert F. Weir, of New York; Councilman, Porter, Richardson, and Warren, of Harvard; Carmalt, of Yale; Keen, White, Roberts, and Wharton, of Philadelphia; Welch, of Baltimore; Park, of Buffalo; Conner, of Cincinnati; Mudd, of St. Louis; and Senn, of Chicago.

Edwards' Hygiene with Anatomy and Physiology, Being an Amplification of Edwards' Catechism. By JOSEPH F. EDWARDS, A.M., M.D. Intended for Schools and General Reading. Published by Edward B. Slavin, New York. No date.

It is a great pity that in a book designed for public schools the illustrations should not be more accurate than is the case with most of those in this book. The perspective of the picture on page 8, showing the disposal of organic matter, is bad; and the triangular liver, three-cornered heart and variously shaped intestines in another place would cause the ghosts of Vesalius and Gray to rise from their environment. Extremely ludicrous is the picture of a pugilistic encounter on page 45. Some of the schemes and diagrams are much better, but there certainly can be no excuse for the one on page 121. The text of the book is interesting, if somewhat allegorical and after the manner of fables wherein the good children are always rewarded and the bad are horribly punished. As a work of hygiene we have no hesitancy in recommending the general principles it teaches; as a work of art it is a lamentable failure, and we sincerely trust if the book reaches the dignity of a second edition the author will induce the publisher to have it more appropriately illustrated.

Text-Book of Chemistry. Intended for the Use of Pharmaceutical and Medical Students. By SAMUEL P. SADTLER, Ph.D., F.C.S., and HENRY TRIMBLE, Ph.M. Philadelphia: J. B. Lippincott Company. Pages, 950 octavo. 1895. Price $5.

This book is of a much higher order of chemistry than is usually supplied to students and seems to be well calculated for the uses and purposes of practical chemists. As a text-book for the use of medical students, it would perhaps be more convenient if the questions had been added as in some of the other works on chemistry, in order that the student might be able to grasp the full meaning and purport of the technical propositions contained in the text. Part I gives a brief outline of elementary physics. Parts II and III describe the elements as divided into non-metals and metals. Part IV deals with organic chemistry. Part V gives a brief outline of qualitative and quantitative analysis, and here original methods are described. A number of assays of the U. S. Pharmacopœia are also added. This book is one of the highest practical character, and while there is a good deal in it that the student of medicine will not particularly need in after life, yet it is well to have once known the methods of mineralogical analysis, even if it shall only serve as convenient pegs of memory on which to hang correlated scientific theories. For pharmacy students and chemists it leaves nothing to be desired.

Elements of Pathologic Histology with Especial Reference to Practical Methods. By DR. ANTOINE WEICHSELBAUM, Professor of Pathologic Anatomy and Director of the Institute of Pathologic Anatomy in the University of Vienna. Translated by W. R. DAWSON, M.D., Demonstrator of Pathology in the Royal College of Surgeons, Ireland, etc., with 8 plates and a large number of illustrations in the text, some of which are colored. London: Longmans, Green & Company. 1895.

This book has been divided into chapters, English fashion, by the translators, and we find thirteen of them as follows: Chapter I follows an introduction of nine lines, and is devoted to histologic methods of investigation. Chapter II is divided into bacteriologic methods of investigation. Chapter I is divided into three parts, and Part II into six chapters covering the general pathologic histology as follows: 1, Retrograde Changes in Tissues; 2, Progressive Tissue Changes, Inflammation, Infective Granulation Tissue, Tumors; 3 and 4, Tumors or new Formations; 5, Parasites, which includes vegetable parasites, under which heading the Bacteria are included. Chapter VI, Animal Parasites, which includes the protozoa, sporozoa, infusoria, cystoides, trematoides, pneumatoides and arthropoda. Part III, Special Pathologic Histology, divided into thirteen chapters: I, The Blood; II, Circulatory Apparatus; III, The Spleen, Lymphatic and Thyroid Glands and Suprarenal Capsule; IV, Digestive Apparatus; V, Liver, Bile Ducts and Pancreas; VI, Respiratory Apparatus; VII, Urinary Apparatus; VIII, Generative Apparatus; IX, Nervous System; X, Organs of Locomotion; XI, Skin; XII, Eye; XIII, Ear.

The book is beautifully printed; the paper is excellent; the illustrations all that could be desired. The book contains the latest investigations on the subject of which it treats and will repay the most careful study. The photographs of various bacteria, which are shown at the end of the volume, are extremely handsome.

Manual of Chemistry. A Guide to Lectures and Laboratory work for Beginners in Chemistry. A Text-book specially adapted for Students of Pharmacy and Medicine. By W. SIMON, Ph.D., M.D., Professor of Chemistry and Toxicology, College of Physicians and Surgeons, Baltimore; Professor of Chemistry in the Maryland College of Pharmacy. New (fifth) edition. In one octavo volume of 502 pages, with 44 engravings and 8 colored plates illustrating 64 of the most important chemic tests. Philadelphia: Lea Brothers & Co. 1895. Cloth, $3.25.

The fifth edition of this well-known text-book has been prepared with great care, and the changes and additions made were necessitated by the desire of the author to bring the work into close relation with the new Pharmacopœia. The author has not altogether followed the orthography recommended by the Chemic Section of the American Association for the Advancement of Science because, as he states:

"Neither the leading chemical journals nor the U. S. Pharmacopœia have used the spelling." The first part of the work considers the fundamental properties of matter. The second treats of the theories of atomic constitution. The third and fourth, of the consideration of non-metallic and metallic elements and their compounds. The fifth is devoted to analytical chemistry and is also intended to serve the student as a guide to laboratory work. The sixth treats of organic chemistry. The seventh and last parts are devoted to physiologic chemistry. We note with pleasure that the decimal system has been strictly adhered to in all weights and measures, and that the degrees of temperature are expressed in the same system. There are eight colored plates showing the compounds of various metals, benzine derivatives, reactions of the alkaloids, the urine and test for its constituents. The colorings have been very accurately represented and add very greatly to the value of the work. We commend this book to our readers.

Suggestive Therapeutics in Psychopathia Sexualis; with Especial Reference to Contrary Sexual Instinct. By DR. A. VON SCHRENCK-NOTZING (Munich, Germany). Authorized translation from the German by CHARLES GILBERT CHADDOCK, M.D., Professor of Diseases of the Nervous System, Marion-Sims College of Medicine, St. Louis; member of the American Medico-Psychological Association; Attending Neurologist to the Rebekah Hospital, St. Louis, Mo., etc., etc. One volume, royal octavo, 325 pages. Extra cloth, $2.50 net; sheep $3.50 net. Sold only by subscription to the medical profession exclusively. Philadelphia: The F. A. Davis Co.

The translator says the favorable reception given Von Kraft-Ebing's "Psychopathia Sexualis" induced him to undertake an English version of the work by Dr. A. Von Schrenck-Notzing. The views for which the latter contends are able and are in striking contrast with those held by Kraft-Ebing, and for that reason deserve to be placed in English by the side of Psychopathia Sexualis. The author is a firm believer in the efficacy of suggestive therapeutics and hypnotic treatment in the cases of sexual perverts, paresthesia and impotence. The author on page 302 gives a summary of results in thirty-two cases, which may be arranged as follows:

Failures	5	= 15.625	per cent.
Slightly improved	4	= 12.5	" "
Essentially improved	11	= 34.375	" "
Cured { with later report	15 } 12	= 37.5	" "
Cured { without later report	2 }		
Total		32.100	" "

Of twenty-three patients, five were not amenable to hypnosis; eight passed into somnambulism, thirteen into hypotaxis, and three became only somnolent. In three cases the degree of susceptibility is not given by the authors. More than one-third of the cases were completely cured, and in ten of these it was possible to determine by later observation that the cure was persistent. In several cases the period of observation extended over a year; indeed Kraft-Ebing observed one case for two years, and I had the opportunity of watching a discharged patient two years and seven months. Four other patients were kept under observation more than a year, and a somewhat larger number longer than six months.

There is added to this book an appendix which was prepared for the English edition October, 1894, and which has been translated from this manuscript by Dr. Chaddock. In this appendix the facts are confirmed and the theories of the author seem to be well sustained.

The publisher deserves commendation for confining the sale of this book exclusively to the members of the medical profession.

Transactions of the Royal Academy of Medicine in Ireland. Edited by WM. THOMPSON, M.A., F.R.C.S., General Secretary. Dublin: Fannin & Company. 1894.

These transactions contain the usual arrangement of the general rules of the Academy, list of officers, members, student associates, annual reports, and the like. It is then divided into six sections. Section of Medicine, which contains eleven papers. Section of Surgery, containing ten papers. Section of Obstetrics, eight papers. Section of Pathology, seven papers. Section of State Medicine, two papers, and Section of Anatomy and Physiology, seven papers. These last papers are followed by reports of collective investigations in the anatomic department of Trinity Medical College and in the anatomic department of Catholic University Medical School.

These collective investigations are anatomic, and the first is on the point of bifurcation of the abdominal aorta. The following results were given at Trinity College: 74.5 per cent. of the total number bifurcated at the fourth lumbar vertebra; the next place of frequency was on the intervertebral disc between the fourth and fifth lumbar vertebræ, the percentage being 19.2, while in 4.2 per cent the aorta bifurcated on the fifth lumbar vertebra, only 2.1 per cent. on the intervertebral disc, between the third and fourth lumbar vertebræ.

In males the taller the subject, the greater the tendency of bifurcation at the lower level; but in females the tendency, if any, is in the opposite direction.

At the Catholic University Medical School, out of twenty-two subjects examined, the aorta divided in fourteen on the body of the fourth lumbar vertebra, slightly to the left of the median line. Of the remaining eight, seven were opposite the intervertebral disc between the fourth and fifth lumbar vertebræ, and one between the third and fourth.

Another collective investigation was taken as to the level of termination of the spinal cord, and considered regardless of sex, the Trinity Medical School found that in 65 per cent. of all subjects, the cord terminated at some point on the first lumbar vertebra. In the separate examination of sexes, it was found that in males by far the greater number of cords ended on the first lumbar vertebra, while in females the cord has a distinct tendency to encroach on the second lumbar vertebra. In 52 per cent. of the female subjects the cord ended on the second lumbar vertebra, and in 48 per cent. on the first.

Mr. Roughlan, at the Catholic University Medical School, reports having examined nine subjects, in four of which the cord ended at the disc between the first and second lumbar vertebræ, in two at the junction of the middle and lower third of the first lumbar vertebra, in two at the junction of the middle and lower third of the second lumbar vertebra, and in one case at the lower end of the second lumbar vertebra.

Another investigation was made of the presence of the palmaris longus, plantaris and pyramidalis muscles, and the Trinity School found, in examining seventy-eight arms, the palmaris longus in 88.45 per cent. In 11.34 per cent. it was not represented. Considering right arms, it was present in 92 per cent.; absent in 7.9; whereas in left arms it was found in 85 per cent., and wanting in 15 per cent. from which, says the reporter, "it would seem to be more frequently absent on the left side." The plantaris was investigated in seventy-three legs, and found to be present in 93.15 per cent. No preference was shown for either side. In 7 per cent. there was scarcely any muscular belly. In one leg the tendo Achillis was three inches above the insertion. The pyramidalis abdominis was examined in forty-three subjects and found to be equally developed on the right and left sides. It was present in 60.47 per cent., and absent in 39.53 per cent. On the other hand, in females it was only present in 58.4 per cent., and absent in 41.5 per cent. The whole tendon shows the muscle is becoming extinct, this being more marked in the female sex.

It is curious to note the close correspondence of the examinations made in the Catholic University Medical School, which may be fairly said to be the "control" experiment. In thirty-four arms examined, the palmaris was present in 88.82 per cent. As will be seen above, this varies 42 per

cent. from the Trinity Medical School observations. In thirty-four legs examined, the plantaris was present in 97 per cent. The pyramidalis abdominis was present on both sides in 85.7 per cent.; present on one side in 7.2 per cent., and absent on both sides in 7.2 per cent. of the cases. Present on both sides in nine males. In five females it was absent once, and absent on one side once.

There are very many interesting papers in this volume, and the book will well repay careful study. The paper of Dr. Flynn, D.P.H., on "Recent Developments in the Study of Medicine" is worthy of careful perusal. It has especial reference to State inspection of industries and unhealthy areas, and in connection with notification of registration he quotes our Dr. Hewitt, of Minnesota, with approval.

The Aseptic Treatment of Wounds. By DR. C. SHIMMELBUSCH, with a preface by PROFESSOR BERGMANN; translated from the second German edition by ALFRED THEODORE RAKE, M.B. Crown 8 vo., pages 266. London: H. K. Lewis. 1894. Price $1.25.

Dr. Schimmelbusch is the assistant of Dr. Von Bergmann at Berlin, and during the Tenth International Medical Congress many of our readers will remember the appliances for the sterilization of dressings which were there exhibited by Dr. Schimmelbusch under the direction of Professor Bergmann. There are sixteen chapters in the book, divided as follows: I, The Importance of the Aseptic Treatment of Wounds; II, Infection by the Air and by Contact; III, The Material Causes of Wound Infection; IV, Disinfection; V, Disinfection of the Surface of the Body; VI, Sterilization of Metal Instruments; VII, Aseptic Dressings; VIII, Aseptic Sutures and Ligatures; IX, Aseptic Drainage of Wounds; X, Aseptic Sponges; XI, Aseptic Use of Hypodermic and Aspirating Needles; XII, Aseptic Principles Applied to the Passage of Catheters and Bougies; XIII, Sterilization of Fluids for Washing and Irrigation; XIV, Operating in Sick Rooms; XV, Aseptic Operations and Wound Treatment; XVI. Improvisation of Aseptic Dressings for Emergencies and Treatment of Injuries. A rather extensive bibliography and a copious index conclude the volume.

With reference to the sterilization of catgut ligatures, the author says (page 119): "Von Bergmann has catgut treated with a 1 per cent. solution of perchlorid of mercury in 80 per cent. alcohol. The treatment lasts at least forty-eight hours and preferably longer. Catgut is placed in a mixture of sublimate and alcohol, which at first becomes cloudy and must be changed until it remains quite clear; it is afterward kept in ordinary alcohol. Experiments have lately been made with a view to making use of the high disinfectant powers of heat in the disinfection of catgut. For this purpose, steam and boiling water are quite out of the question, for in a few minutes under either, catgut swells up into a formless tangle and is converted into glue. The addition of strongly corrosive substances to the water, such as sublimate, chromic, or carbolic acid makes no difference as the author's experiments show. On the other hand, hot air can be used for sterilizing catgut. . . The catgut is heated for three hours up to 140 C. in a well-regulated, hot air sterilizer; in spite of the great heat the gut keeps its elasticity and firmness." The author thinks, however, that to obtain good results from hot air alone, it is necessary that a temperature of 140 C. should be reached very gradually, and it takes some hours. Moreover, the water must be extracted from the gut by previous immersion in alcohol. If the gut be placed in xylol, it can be brought to 140 much easier. The author gives numerous experiments and concludes by saying that, "in the Royal Clinic at Berlin, the old method of treating catgut with sublimate has been retained."

The details are as follows: 1, a glass receptacle is sterilized for three-quarters of a hour in steam; 2, the threads of catgut are wound upon glass reels or plates, as the case may be; 3, if the gut contains fat, the fat is removed by allowing it to lie in ether for twenty-four hours; 4, after the ether has been poured off the gut is allowed to lie in an alcoholic solution of sublimate of the following composition:

Sublimate	10
Absolute alcohol	8
Distilled water	200;

5, the solutions are renewed every twenty-four hours, and again every forty-eight hours. This part of the process must last not less than forty-eight hours; 6, the gut is removed from the sublimate solution and placed in alcohol, which should be absolute if but stiff gut is required, or diluted with not more than 20 per cent. of glycerin for a softer form of gut. Sublimate may be added as in the fourth stage of the process if desired; the vessels must be kept well closed. This method is easy to carry out even on a small scale."

This book is destined to meet with a warm reception in the United States, and we are sure that there is need for a handbook of this character at this time.

Periodicals.

MEDICINE.—A new medical journal will be started in Chicago within a few days. It will succeed the *Western Medical Reporter* which is to be suspended. The journal is to be a high class monthly entitled *Medicine*, under the editorial management of Dr. Harold N. Moyer, and a competent staff of assistants. Mr. George S. Davis, of Detroit, is the publisher. The new enterprise was launched on March 20 at an excellent dinner given by Dr. Moyer and Mr. Henry G. Furber to Mr. Davis. There were present the representatives of the medical press of Chicago, the members of the editorial staff of *Medicine* and the editor of this JOURNAL. All present wished the new venture success.

ANNALES D'OCULISTIQUE.—This interesting periodical founded by Florent Cunier, fifty-eight years ago, continued by Worlomont, and at present edited in Paris by Dr. E. Valude and Dr. D. E. Sulzer, (French edition) now has an American edition edited by Dr. George I. Stevens, which is an exact reproduction of the French edition published in Paris.

THE PETERSON MAGAZINE. New York: Penfield Publishing Co.—This magazine for March is one of the most profusely illustrated periodicals that finds its way to our sanctum. The physician's reception room table can have no more entertaining magazine than the March *Peterson*.

NECROLOGY.

MATTHEW DICKINSON FIELD, M.D., of New York city, died March 8, aged 42 years. He was a member of the famous family of Fields, hailing from western Massachusetts, he being nephew to both Cyrus W., and David Dudley, of that name; his own father was a civil engineer. He was educated in arts at Williams College, in medicine at Bellevue Hospital Medical College and then served as an interne. Three years after graduating, in 1882, he was appointed an expert in lunacy at the insane pavilion of that hospital, and in that capacity he had thousands of warped minds and suspects pass under his examination. He was early attached to the surgical staff of the Manhattan Elevated system, and later became the chief surgeon of the railway. He was a frequent expert witness in the courts, in cases where the for a time fashionable plea of insanity was in vogue for the liberation of criminals, as well as in the damage cases against corporations. He was married to Lucy Atwater about ten years ago, and she with two children survive him. He was a member of the Medico-Legal Society, of the Academy of Medicine, of the Society of Medical Jurisprudence, of the Alumni Society of the Bellevue Hospital Medical College, of the Neurological Society and of the County Medical Association. He was also a lecturer at the Bellevue Hospital Medical College. His final ill-health and demise were referable to renal disease, with cardiac complications, that had incapacitated him for professional work since last October. Interment took place at Stockbridge, Mass.

G. W. SAMPSON, SR., M.D., pioneer of the Sandusky Valley, died at Tiffin, Ohio, at the age of 93 years. He practiced

for sixty years, and was president of the first medical convention in Ohio.

A. A. COLLIER, M.D., of Trenton, Mo., March 14, aged 65 years.——James T. Hester, M.D., of Athens, Ga., March 12, aged 53.——R. O. DuBois, M.D., of New York, March 9, aged 36.——John H. Ellis, M.D., of Chillicothe, Mo., March 10.——Mary Jane Lane, M.D., of Webberville, Mich., March 10.——Thomas Gann, M.D., a prominent physician of Jamestown, Ky., March 15.

SOCIETY NEWS.

Chicago Ophthalmological and Otological Society.—The regular meeting was held at the Saratoga Hotel, Feb. 12, 1895, DR. GRADLE in the chair. There were twenty-eight members in attendance.

The minutes of the last meeting were read and approved.

DR. WILLIAMS reported nine cases of cataract operated on from 1879 to 1888, in which a stitch was taken through the conjunctiva in order to close the corneal wound. These cases demonstrated that the eye is very tolerant of such sutures. In every case the results were good.

DR. BETTMAN said that Fuchs had tried them but had given them up. Their use is now being advocated in France in simple extraction, in order to prevent prolapse of iris and astigmatism, the stitches being put through the corneal tissue.

DR. COLEMAN had tried them and would always advocate them to prevent prolapse of vitreous.

DR. MEYER read an essay on "The Evidence for the Localization of the Visual Centers."

Society adjourned by limitation. C. P. PINCKARD, Secretary.

The American Climatological Association will hold its next meeting at Hot Springs, Va., June 13, 14 and 15, 1895. This time was chosen to accommodate members of the Laryngological Association, which meets in Rochester the beginning of the following week. Members desiring to read papers on this occasion will please send the titles as soon as possible to the President, Dr. S. E. Solly, Colorado Springs, or to the Secretary. J. B. WALKER.

1617 Green Street, Philadelphia.

The Ohio State Medical Society will hold its fiftieth annual convention at Columbus, Ohio, May 15–17. It is intended to organize a special committee on medical legislation based upon county representation. The program is one of high scientific value, and a large attendance is expected. The officers are as follow: President, D. N. Kinsman; Secretary, Thos. Hubbard, Toledo; Treasurer, J. A. Duncan.

MISCELLANY.

A Theme for Mr. Ernest Hart.—There were seventy-eight suicides in the city of Chicago during the first seventy-eight days of the present year. The JOURNAL is prepared for the inevitable "wishy-washy everlasting flood" of moralizing and predictions of rapid depopulation of what Mr. Ernest Hart is pleased to style "Porkopolis."

Pean's Work in Abdominal Surgery.—During the years 1889 and 1890, 2,200 patients were treated by Professor Pean in his service at the Hospital St. Louis, and more than a thousand were operated on. The number of deaths directly attributable to the operations was seven. From 1864 to January 1, 1892, M. Pean removed 2,100 tumors of the abdomen and pelvis. Of the 585 new operations performed, 47 alone were unsuccessful.

Yellow Fever Martyrs.—Dr. H. R. Stout, of Jacksonville, Fla., asks to correct a statement recently made in a New York journal, to the effect that a certain physician of the former place was the only one who remained during the yellow fever epidemic of 1888. Dr. Stout says: "All the physicians of the city, with one exception, remained here, and not only that, but most of us had the disease, and four of our number laid down their lives serving their fellow men."

The Profession in England.—According to the Medical Directory for 1895 there are 26,790 physicians in the United Kingdom, of whom 21,055 are in England, 3,224 in Scotland and 2,511 in Ireland, or a mean of one doctor for 1,240, 1,280 and 1,875 of population respectively. If we add the members of the profession in the Army, Navy and Indian Medical Services we have a total of over 32,000. London has 5,742 practitioners, or one to every 830 inhabitants, while in Paris the number is only 2,237, one to every 1,100 inhabitants.

Action of Iron on the Organism.—Rosendahl (*Eira*) has often observed that subcutaneous injections of iron salts in frogs causes gastro-enteritis. The results of his experiments seem to show that the iron salts of the pharmacopœia are not assimilated by the alimentary canal of man or mammals if this tube is in a normal condition. After their administration by the mouth they can not serve as material for the elaboration of hemoglobin, nor directly influence it. For the treatment of chlorosis homol, homogallol or ferratin are much superior to the preparations of iron in use at present. These new remedies may be destined to replace the latter, for the principal object of treatment of chlorosis is to increase the strength of the blood in hemoglobin.

Liability of Railways for Surgeon's Malpractice.—A comparatively new question which the courts are having to settle is that with regard to the extent to which a railway company that maintains a "medical department" is liable for the negligence of its physicians and surgeons. In a recent case where this question was raised, it did not appear that the company was under any obligation by contract to furnish surgical and hospital accommodations for its injured employees, and so far as was shown, its doing so was wholly voluntary. Nor were its employees under any obligation to avail themselves of the facilities for treatment offered, and paid nothing for them when accepted. That the company maintained its medical department for its own advantage and not for charitable purposes only, the Supreme Court of Iowa holds (Eighmy v. Union Pacific R'y Co., decided Jan. 28, 1895, 61 N. W. Rep. 1056) might be presumed, but that did not alter what appeared to be the fact, that it was not maintained to discharge any statutory or contractual obligations. Its duty, under the circumstances, was to select a reasonably competent man for surgeon, and it was liable only for a neglect of that duty and not for any negligence or malpractice of the latter. And in performing such duty, it was bound only to the exercise of reasonable care and diligence.

Some Things a Physician can Testify To.—A physician was permitted in a personal injury case, to describe the condition in which he found the plaintiff, giving both subjective and objective symptoms at the time when the latter became his patient, a year and a half after the accident happened. This was objected to. But the Supreme Court of Wisconsin holds, (Block v. Milwaukee St. R'y Co., decided Feb. 5, 1895, 61 N. W. Rep. 1101) that so far as his testimony related to the seriousness of the injury, this was competent. Nor was it liable to the objection that it was hearsay. So far as the knowledge of plaintiff's condition was derived from plaintiff's statements to him as a medical man for the purpose of receiving advice and treatment, the testimony was not incompetent for that reason. It was also stated as an error that the doctor was permitted to testify that plaintiff's condition, as he found it, could have been produced by contact with a wire heavily charged with electricity. And again the court holds that the testimony was both relevant and competent. The doctor was also permitted to give his opinion of the "reasonable probability" of the plaintiff's ultimate recovery from

his injuries. Of this the court says that while it was true that the whole testimony must establish, in the minds of the jury, more than a mere "reasonable probability," and must amount to proof to a "reasonable certainty," this ultimate fact was susceptible of proof by items of testimony which did not, separately, fully establish it. The phrase "reasonable probability" was equivocal. It was for the jury to give force to the doctor's testimony in accordance with the intention of the words used, rather than with a strict or technical definition of the words. This was not error.

Prophylaxis of Ophthalmia Neonatorum.—In a recent communication to the Obstetrical and Gynecological Society of Paris, Budin recommends the use of a solution of argentic nitrate, 1 to 150, for the prophylaxis of the ophthalmia of the new-born.—*L'Union Medicale.* He divides the disease into two categories from a clinical point of view—primary and secondary. The former occurs on the second or third day after birth; it is very grave if not attended to immediately. The secondary ophthalmia, occurring from the tenth to the twelfth day after birth, is less grave. Primary ophthalmia is most often due to the gonococcus or the bacillus of Wecks; secondary ophthalmia, to the streptococcus, staphylococcus or pneumococcus. Prophylactic measures are of two sorts: First, hygienic surroundings and exclusion of all contagious diseases—erysipelas, whitlow, conjunctivitis, etc.; second, the washing of the child's eyes as soon as possible after birth with an antiseptic. Crede's method—nitrate of silver, 1 to 50—is the best known. Other solutions used are sublimate—1 to 5,000, carbolic acid, 2 per cent., lemon juice, iodoform, etc. M. Budin, having noticed that Crede's solution often caused swelling of the eyelids and excessive lachrymation during the first few days, employed a solution diluted to one-third—1 to 150. Of 2,004 children treated thus, 2 had cases of primitive ophthalmia. The author recommends that midwives should be compelled to use this means, which entails little trouble.

Medico-Literary Items.—The author of the much quoted sketch "The Country Practitioner," has hitherto borne the pen-name of Ian MacLaren. His real name is Watson, the Rev. John MacLaren Watson. He is an eloquent preacher, a hard worker and a genuine Scotsman. He has published a volume of short stories under the title "Beside the Bonnie Brier Bush."

Ginn & Company, New York, will soon publish Daniel De Foe's *Journal of the Plague Year*, or as it is sometimes called, "The History of the Plague of London."

Dr. William H. Thomson will publish through the house of Harpers a religious work "The Parables and their Home: The Parable by the Lake."

Dr. Conan Doyle has been engaged to write a series of historical stories for the London *Strand*. He has chosen the title, "The Adventures of Brigadier Gerard," he being the modern presentment of a cavalry officer of the Old Guard of Napoleon. The last book issued by Dr. Doyle bears the title "'Round the Red Lamp, being Facts and Fancies of Medical Life." These stories have not received the same favorable comment from the reviewers that was won by several of his earlier books. One critic says of the later stories that they are always morbid, pessimistic, and that when they happen to be optimistic, they are not exciting.

The number of new books on medical science and hygiene produced in 1894 was 140, new editions 21; this being a smaller number of new books than for 1893. Of this number, 161, there were 145 written by American authors. Fourteen were by English authors, imported in sheets and bound in the United States.

James R. Cocke, of Boston, an Eclectic medicine man, has published a book of nearly four hundred pages on "Hypnotism," claiming to have hypnotized 1,300 persons.

A recent book by Dr. S. Wier Mitchell, "When all the Woods are Green," tells the story of a party of pleasant folk who went salmon-fishing on one of the Canadian rivers.

Dr. Arabella Kenealy of London, the author of a medical fiction called "Dr. Janet of Harley Street," has a new work, "Some Men are Such Gentlemen."

It is not generally known that the late Lieut. Frederick Schwatka, U. S. A., was a medical man as well as explorer, author and lecturer. But such was the fact, he having graduated from Bellevue Hospital Medical College in 1876.

The Appletons have produced Quatrefage's second volume in his Anthropological Series, "The Pygmies." The translation is by Professor Frederick Starr. The author has here gathered all the latest facts regarding the small black races of Africa.

The Bacteriologic Laboratory of the Harvard Medical School.—(Prof. H. C. Ernst in *Harvard Graduates Magazine*, March, 1895.) Believed to be the first of its kind in this country in connection with undergraduate instruction, yet it is only nine years since the first lectures were given in it to medical students. Since then no year has passed without an enlargement, either of the laboratory or the scope of its instruction. Its primary function is to teach medical students. In the latter part of the first year there is a required course of lectures and laboratory work, and an examination follows. This course is brief, practical and covers rudiments needed for every practitioner. In the fourth year there is an elective course extending over half the year, and this is more extensive. A second function of the laboratory is the training of specialists giving advanced instruction, and encouraging original investigation. This function is fulfilled by a summer course of six weeks for practitioners and by two courses for graduates during the winter. The third function is the guidance of measures which affect the general public in connection with boards of health. The best example of this is the proved necessity for a bacteriologic diagnosis of diphtheria. The methods for this are simple but require special training and a well-equipped laboratory. The most promising and important research thus far carried on in the laboratory is that of the late Dr. S. C. Martin, whose death arrested his work at its most critical stage. It was an effort to isolate and cultivate the contagium vivum of cowpox with the intent of substituting this for the ordinary vaccine virus. This work was left at such a point that it seems as if money alone were needed for its accomplishment. Important original work is now being carried on by several investigators. It is probable that at least 12,000 examinations for diphtheria will be made during the present year. The Board of Health of Boston has appointed the head of this laboratory to take charge of the work of production of the antitoxin for diphtheria and to be responsible for the efficiency and accuracy of the work.

Society Notes.

THE MEDICAL ASSOCIATION OF GEORGIA meets in Savannah, Ga., on April 17, 18 and 19, 1895; officers elected are: President, W. F. Westmoreland, Atlanta, Ga.; Vice-Presidents, R. H. Taylor, Griffin, Ga.; W. Tate, Tate, Ga.; Treasurer, E. C. Goodrich, Augusta, Ga.; Secretary, D. H. Howell, Atlanta, Ga.

THE ILLINOIS STATE MEDICAL SOCIETY.—The annual meeting will be held the third Tuesday in May, 21 to 23. The annual dinner will be an interesting feature of the occasion. Although this is the forty-fifth meeting of the society, it is the first attempt to gather together the members at an annual feast. The well-known custom of the Massachusetts Medical Society is intended to be followed. Railroad rates have been applied for.

Hospital Notes.

AT a meeting of the executive committee of the Johns Hopkins Hospital held in Baltimore, March 12, Dr. H. C. Parsons was appointed assistant resident physician, and Dr. Theobald Coleman, assistant resident surgeon.——The cornerstone of the Lamar Hospital at Augusta, Ga., was laid March 12.——The city council of Worcester, Mass., have voted to appropriate $30,000 for the construction of a new ward at the City Hospital.——The Hygeia Sanitarium at Kalamazoo, Mich., was destroyed by fire March 14. Loss estimated at $8,000.

Louisville Notes.

KENTUCKY SCHOOL OF MEDICINE.—This institution has sustained a great loss in the death of the President of its Board of Trustees, Rev. John A. Broaddus, D.P.,LL.D. Dr. Broaddus was a man of great worth, a prominent educator, a prolific writer, and a great scholar, and there is no man in the United States whose death could cause more widespread sorrow in Louisville than the death of Dr. Broaddus. He was born in Culpepper County, Virginia, Jan. 27, 1824, and died in this city March 16, 1895. As was chronicled in these columns recently, Dr. Broaddus made an address at the opening of the Kentucky School of Medicine and Hospital, and dedicated it to the cause of science, and for the use of the sick poor.

DEATH REPORT.—For the past week there were 86 deaths reported. Of these 23 were caused by pneumonia, 7 from bronchitis, 8 from consumption, organic disease of the heart 4, la grippe 2, cerebral meningitis 5, and there were 3 stillbirths. There were 53 males, 33 females; 57 white, 29 colored, 53 single, 33 married. Nine deaths occurred at the City Hospital.

MATTHEWS.—Dr. Jos. M. Mathews made the address before the Marion-Sims Medical College of St. Louis, Mo., on the 19th inst., at their regular commencement.

St. Louis Notes.

THE ST. LOUIS MEDICAL SOCIETY.—At the meeting on March 16 the society discussed a resolution introduced by Dr. William Johnston at a previous meeting which urged the Legislature to pass the bill now pending for regulating the practice of medicine. The bill provides that no one shall enter into practice who has not previously obtained a certificate issued by a State Board of Examiners, to consist of seven members, four of whom are to be regular practitioners, three homeopaths and one eclectic. The society rejected the resolution, thus refusing to indorse the measure. Under the scientific program, perishable specimens were submitted by Dr. L. H. Laidley and by Dr. Carson; Drs. Frey and Pollak discussed the special features of the cases. A paper on Ainhum, with a specimen, was presented by Dr. A. H. Ohmann-Dumesnil, and Dr. H. H. Summa reported an operation, illustrated with a specimen. No reference was made to the proceedings of the Committee on Ethics in the Loftus-Marks case. It is understood, however, that all the evidence has been heard, and that the committee is ready to prepare its final report.

THE BEAUMONT HOSPITAL MEDICAL COLLEGE held its annual commencement exercises Thursday evening, March 14, at which seventeen graduates were granted the degree of M.D.

THE BARNES MEDICAL COLLEGE held its third annual commencement March 14, graduating a class of sixty-four.

THE MISSOURI MEDICAL COLLEGE graduated a class of seventy on March 19.

THE MARION-SIMS COLLEGE OF MEDICINE held its annual graduating exercises on March 18, conferring degrees on a class of fifty-four. Dr. J. M. Mathews, of Louisville, addressed the graduates of the Marion-Sims College on the evening of March 18.

JUDGE RASSIEUR, of the Probate Court, on March 16, denied an application for an inquiry into the mental condition of Arthur Duestrow, on the ground that this question was pending in a criminal court. The application was made at the instance of Dr. A. C. Bernays, who sought in this way to hasten the settlement of a bill for over $15,000 for services rendered in attempting to save the life of the paranoiac's wife, for whose death Duestrow is now under indictment. The question of the prisoner's insanity is still undetermined in the courts.

THE PRESENT MISSOURI LEGISLATURE has passed the following bills relating to medical interests: Making it a felony to detain a person alleged to be insane without examination by reputable physicians; raising the age of consent to 18 years; to prohibit the practice or teaching of osteopathy without diploma; admitting oculists, aurists and dentists to the class of "practitioners of medicine," within the meaning of the statute exempting persons in these classes from jury service, fire department duty, etc; providing for examination of candidates for license as pharmacists by the State Board of Pharmacy.

The following bills have been defeated: Turning Fulton Asylum over to the homeopaths; exempting medical practitioners of all kinds from jury, fire department and military service; to compel labeling of packages of food and drugs with name of all ingredients—a pure food bill; making it a misdemeanor for a druggist to substitute some other article than that named in the physician's prescription without formal permission.

Washington Notes.

MEDICAL SOCIETY OF THE DISTRICT.—At the meeting of the society held on the 13th inst., Dr. Fry reported a case of Cæsarian section, both mother and child saved; and a case of symphysiotomy, child saved and mother made a prompt recovery without any alteration in natural gait. Both subjects brought out a full and interesting discussion. Dr. Glazebrook presented some interesting specimens which he had collected in the coroner's department, viz., stab wound of heart, severe wound of kidney from fractured rib, primary ulcer of stomach with perforation and fatal peritonitis, gunshot wound of spinal cord, endothelial sarcoma of vermiform appendix; and gave the histories of each. An interesting discussion followed.

THE WASHINGTON OBSTETRICAL AND GYNECOLOGICAL SOCIETY.—The two hundred and twenty-fifth meeting of the society was held on the 15th inst. Dr. Adams read the paper of the evening, the report of a case of croupous pneumonia complicating scarlet fever. Dr. Sprigg reported a case of nephritis.

THE BENEFIT FOR THE WOMAN'S CLINIC.—The directors and friends of the Woman's Clinic gave a very pleasant musical entertainment for the benefit of the Clinic on the 11th inst. The friends of the hospital were out in full force and a good sum was realized. This hospital and dispensary is conducted almost entirely by women physicians and is doing excellent work.

SMALLPOX IN THE DISTRICT.—There were two new cases of smallpox discovered last week. Both were children in the same family. They were promptly removed to the hospital and are doing well.

THE NEW SMALLPOX HOSPITAL.—The work on the new smallpox hospital will very shortly be begun. The reduction in the appropriation from $30,000 to $18,000 will cause considerable delay and possibly some alteration from the original plans. The Commissioners are considering the advisability of following the original plan as far as the appropriation will go, and asking Congress next year for sufficient funds to carry out the original designs.

REPORT ON SEWERS IN THE DISTRICT.—In compliance with a Senate resolution of February 22 last, the Commissioners have had prepared considerable interesting data relating to the paving of streets, the laying of sewer and water mains, etc., in the limits of Washington and Georgetown. A list of streets showing the number of linear feet of each, wholly or partially supplied with sewer facilities, has been prepared by Captain Beach. There are 102,300 feet of unsewered streets running east and west, and 72,250 feet partially sewered. Of streets running north and south, including Georgetown, there are unsewered 108,350 feet, and partially sewered 51,450 feet. In Georgetown there are 5,200 feet of unsewered

streets running east and west, and 5,900 feet partially sewered running in the same direction. The total estimated cost of building sewers where they are lacking is $1,008,950. Captain Beach states that there are an immense number of sewers in the city in such condition that they must be replaced in order to provide the city with proper sewerage facilities. There are about fifty miles of such sewers.

GOOD WATER FOR FORT MYER.—The scare at Fort Myer by the discovery of polluted wells there has about subsided. The new well capable of furnishing 100,000 gallons in twenty-four hours has been completed and the analysis shows the water to be exceptionally good in all respects.

HEALTH OF THE DISTRICT.—The report of the Health Officer for the week ended March 9 is as follows: Number of deaths (still-births not included), white 84, colored 42, total 126. Death rate per 1,000 per annum, white 23.80, colored 25.10, total, 24.22. Death rate per 1,000 per annum for corresponding week last year, 23.17.

AMENDMENTS TO THE MEAT INSPECTION BILL.—The meat inspection bill approved March 2 carries the following amendments, and is regarded as an excellent health law. The amendments are:

That the Secretary of Agriculture shall also cause to be made a careful inspection of all live cattle the meat of which, fresh, salted, canned, corned, packed, cured or otherwise prepared, is intended for exportation to any foreign country, at such time and place and in such manner as he may think proper, with a view to ascertain whether said cattle are free from disease and their meat sound and wholesome, and may appoint inspectors, who shall be authorized to give an official certificate, clearly stating the condition in which such cattle and meat are found, and no clearance shall be given to any vessel having on board any fresh, salted, canned, corned or packed beef being the meat of cattle killed after the passage of this act, for exportation to and for sale in a foreign country, from any port in the United States, until the owner or shipper shall obtain from an inspector appointed under the provisions of this act a certificate that said cattle were free from disease, and that their meat is sound and wholesome.

That said examination shall be made in the manner provided by rules and regulations to be prescribed by the Secretary of Agriculture, and after said examination the carcasses and products of all cattle, sheep and swine found to be free from disease and wholesome, sound and fit for human food shall be marked, stamped or labeled for identification, as may be provided by said rules and regulations of the Secretary of Agriculture. Any person who shall forge, counterfeit, simulate, imitate, falsely represent or use without authority, or knowingly or wrongfully alter, deface or destroy any of the marks, stamps or other devices provided for in the regulations of the Secretary of Agriculture, of any such carcasses or their products, or who shall forge, counterfeit, simulate, imitate, falsely represent or use without authority, or knowingly or wrongfully alter, deface or destroy any certificate or stamp provided in said regulations shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not exceeding $1,000, or imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

The authority and responsibility of the Secretary of Agriculture were further enlarged to cover the disposition of the carcasses of condemned cattle by the adoption of the following clause:

The Secretary of Agriculture is hereby authorized to make such rules and regulations as he may decide to be necessary to prevent the transportation from one State or Territory or the District of Columbia or to any foreign country, of the condemned carcasses or parts of carcasses of cattle, sheep or swine, which have been inspected in accordance with the provisions of this act. Any person, company or corporation owning or operating any such slaughter house, abattoir or meat-curing, packing or canning establishment, or any employee of the same that shall wilfully violate any provisions of this act, shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be punished for each offense by a fine not exceeding $1,000, or imprisonment not exceeding one year, or by both said punishments, in the discretion of the court.

THE PUBLIC SERVICES.

REPORTS OF SICK AND WOUNDED.

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE.
WASHINGTON, D. C., March 2, 1895.

CIRCULAR NO. 3.

Diseases and injuries reported by medical officers on their "Reports of Sick and Wounded" will hereafter be classified in this office in accordance with the arrangement in the following list; and the statistical tables of the prevalence of disease in the several military commands, appended to the "Annual Report of the Surgeon-General," will be based on this classification.

CLASSIFIED LIST OF CAUSES OF ADMISSION TO SICK REPORT.

INFECTIOUS DISEASES, GENERAL AND LOCAL.

1. Scarlet fever.
2. Measles.
3. Rötheln.
4. Variola.
5. Varioloid.
6. Vaccinia.
7. Varicella.
8. Typhus fever.
9. Influenza.
10. Dengue.
11. Mumps.
12. Whooping cough.
13. Diphtheria.
14. Typhoid fever.
15. Cholera.
16. Yellow fever.
17. Cerebro-spinal meningitis.
18. Malarial fever, intermittent.
19. Malarial fever, remittent or continued.
20. Malarial fever, pernicious.
21. Malarial cachexia.
22. Fevers of undetermined causation.
23. Anthrax.
24. Glanders.
25. Erysipelas.
26. Septicemia.
27. Rheumatic fever.
28. Tetanus.
29. Tuberculosis of the lungs.
30. Tuberculosis of other organs.
31. Carcinoma.*
32. Sarcoma.*
33. Trichinosis.
34. Syphilis.
35. Gonorrhea.
36. Gonorrheal epididymitis and orchitis.
37. Chancroid and results.
38. Other diseases of this class.

(Local infections which are also entered under "Structural and Functional Diseases of Organs.")

39. Scabies, same as 184.
40. Dermatophyti, same as 185.
41. Tonsillitis, same as 87.
42. Pericarditis, same as 114.
43. Endocarditis, same as 115.
44. Bronchitis, same as 124.
45. Pneumonia, croupous, same as 132.
46. Pleurisy, acute, same as 133.
47. Dysentery, same as 101.
48. Peritonitis, acute, same as 89.
49. Pyelitis and Pyelonephritis, same as 135.
50. Cystitis, same as 141.
51. Lymphangeitis, same as 156.
52. Adenitis, excluding 34 and 37, same as 155.
53. Abscess, same as 172.
54. Furuncle, same as 173.
55. Carbuncle, same as 174.
56. Hospital gangrene, same as 176.
57. Whitlow, same as 161.

*Etiology not determined; probably due to parasitic infection.

II—DISEASES OF NUTRITION, GENERAL.

58. Anemia.
59. Leucocythemia.
60. Glycosuria.
61. Gout.
62. Scurvy.
63. Other diseases of this class.

III—STRUCTURAL AND FUNCTIONAL DISEASES OF ORGANS.

(A) Diseases of the Nervous System.

64. Alcoholism, acute.
65. Alcoholism, chronic.
66. Delirium tremens.
67. Apolexy.
68. Cerebral congestion.
69. Chorea.
70. Epilepsy.
71. Insanity.
72. Locomotor ataxia.
73. Meningitis.
74. Myelitis.
75. Narcotic poisoning, acute.
76. Narcotic poisoning, chronic or drug habit.
77. Neuritis.
78. Neuralgia.
79. Neurasthenia.
80. Nostalgia.
81. Paralysis.
82. Other diseases of this class.

(B) Diseases of the Digestive System.

83. Corrosive and irritant poisons, effects of.
84. Diseases of the salivary glands and ducts.
85. Diseases of the teeth, gums and alveoli.
86. Diseases of the mouth and tongue.
87. Tonsillitis, same as 41.
88. Pharyngitis.
89. Peritonitis, acute, same as 48.
90. Dyspepsia.
91. Gastritis.
92. Gastric ulcer and hemorrhage.
93. Colic.
94. Constipation.
95. Tænia or other intestinal parasites.
96. Cholera morbus.
97. Diarhea, acute.
98. Diarrhea chronic.
99. Enteritis.
100. Perityphlitis.
101. Dysentery, acute, same as 47.
102. Dysentery, chronic.
103. Hemorrhage, intestinal.
104. Fistula in ano.
105. Hemorrhoids.
106. Biliary colic and calculi.
107. Jaundice, catarrhal.
108. Hepatitis.
109. Hepatic cirrhosis.
110. Other diseases of this class.

(C) Diseases of the Circulatory System.

111. Angina pectoris.
112. Cardiac irritability.
113. Cardiac degeneration.
114. Pericarditis, same as 42.
115. Endocarditis, same as 43.
116. Valvular disease and results.
117. Thrombosis and embolism.
118. Aneurism.
119. Varicose veins.
120. Phlebitis.
121. Other diseases of this class.

(D) Diseases of the Respiratory Organs.

122. Larynx, diseases of.
123. Coryza.
124. Bronchitis, acute, same as 44.
125. Bronchitis, chronic.
126. Bronchitis, capillary.
127. Emphysema.
128. Asthma.
129. Pulmonary congestion.
130. Pulmonary hemorrhage.
131. Pneumonia, catarrhal.
132. Pneumonia, croupous, same as 45.
133. Pleurisy, acute, same as 46.
134. Other diseases of this class.

(E) Diseases of the Genito-Urinary System.

135. Pyelitis and pyelo-nephritis, same as 49.
136. Nephritis, acute parenchymatous.
137. Nephritis, chronic parenchymatous.
138. Renal cirrhosis.
139. Calculus, renal.
140. Calculus, vesical.
144. Hematuria.
145. Prostatitis.
146. Prostatic hypertrophy.
147. Urethral stricture.
148. Balanitis, non-gonorrheal.
149. Paraphimosis.
150. Phimosis.
151. Varicocele.
152. Hematocele.

141. Cystitis, same as 50.
142. Enuresis.
143. Retention of urine.
153. Hydrocele.
154. Other diseases of this class.

(F) Diseases of the Lymphatic System and Ductless Glands.

155. Adenitis, excluding 34 and 37, same as 52.
156. Lymphangeitis, same as 51.
157. Splenic hypertrophy.
158. Other diseases of this class.

(G) Diseases of the Muscles, Bones and Joints.

159. Muscular contraction.
160. Muscular rheumatism and myalgia.
161. Whitlow, same as 57.
162. Osteitis and results.
163. Periostitis, excluding 34 and 57.
164. Arthritis, excluding 27.
165. Arthritis, chronic rheumatic.
166. Bunion.
167. Synovitis.
168. Other diseases of this class.

(H) Diseases of the Integument and Subcutaneous Connective Tissue.

169. Corns and warts.
170. Ingrowing nail.
171. Chilblain.
172. Abscess, same as 53.
173. Furuncle, same as 54.
174. Carbuncle, same as 55.
175. Ulcer.
176. Hospital gangrene, same as 56.
177. Dermatitis from poisonous plants.
178. Erythemata.
179. Psoriasis.
180. Prurigo and lichen.
181. Herpes.
182. Eczema and pemphigus.
183. Impetigo and acne.
184. Scabies, same as 39.
185. Dermatophyti, same as 40.
186. Other diseases of this class.

(I) Diseases of Organs of Special Sense.

(a) Diseases of the Eye.

187. Lids, diseases of.
188. Lachrymal apparatus, diseases of
189. Conjunctivitis, acute.
190. Conjunctivitis, chronic.
191. Corneitis.
192. Sclerotitis.
193. Choroid, diseases of.
194. Iritis.
195. Retinitis.
196. Snow-blindness.
197. Asthenopia.
198. Cataract.
199. Glaucoma.
200. Amaurosis.
201. Night-blindness.
202. Other diseases of the eye.

(b) Diseases of the Ear.

203. Diseases of external ear.
204. Diseases of the tympanum.
205. Diseases of the middle and internal ear.
206. Earache.
207. Deafness.

(c) Diseases of the Nose.

208. Nasal catarrh, chronic.
209. Nasal hemorrhage.
210. Nasal polypus.

IV—ACCIDENTS AND INJURIES.

(A) General Injuries.

211. Burns and scalds, general.
212. Crushing.
213. Drowning.
214. Exhaustion from fatigue or exposure.
215. Explosion.
216. Freezing.
217. Hanging.
218. Insolation.
219. Lightning.
220. Starvation, exclusive of disease.
221. Suffocation, exclusive of disease and 217.
222. Venomous bites, stings and wounds.

(B) Injuries to Special Parts.

223. Abrasions and blisters, mechanical.
224. Burns and scalds, local.
225. Compression of the brain.
226. Concussion of the brain.
227. Concussion of the spine.
228. Contusions and sprains.
229. Dislocations.
230. Foreign bodies, presence of.
231. Fracture, exclusive of gunshot.
232. Frostbite.
233. Hernia, inguinal.
234. Hernia, others.
235. Orchitis from injury.
236. Strain, muscular.
237. Wounds, contused.
238. Wounds, incised.
239. Wounds, lacerated.
240. Wounds, punctured.
241. Wounds, gunshot.
242. Secondary results of local injury.
243. Other local injuries.

V—UNCLASSIFIED.

244. Malingering.
245. Under observation or not diagnosed.
246. Homicide.
247. Suicide.
248. Self-maiming.
249. Judicial execution.

Medical officers in recording the causes of admission to Sick Report will make use of the nomenclature given above in all cases for which a specific title is provided. Experience has shown that this list includes most of the causes of disability likely to occur in Army practice. In recording cases for which a title is not specially provided, as for instance those which in a consolidation of the statistics would be tabulated under "Diseases of the mouth and tongue," "Diseases of the external ear," etc., or thrown among "Other diseases of this class," such terms will be used as will briefly and accurately describe the disease or injury, while conforming as far as possible to the nomenclature generally accepted by the profession. Medical officers will report in this way, also, when the cases are to be consolidated on the classified list under a generic term, as in certain of the diseases of the skin.

In all cases in which the cause of admission is a local manifestation of a general affection, the character and locality of the one and the nature of the other should be stated.

The organ or part affected should be specified when the name of the morbid condition fails to indicate it, as in paralysis, aneurysm, ulcer, herpes, etc., as also in inflammations, as odenitis, osteitis, arthritis, synovitis, etc., and in local injuries, as abrasions, burns, contusions, di-locations, etc.

Inflammations should be reported as acute or chronic. The surgical characteristics of wounds, fractures, hernia, etc., should be stated; and in cases of poisoning the name of the poison should be given.

Nothing in this circular is intended to relieve medical officers from the duty of recording the details of cases as required by paragraph 26, Circular S. G. O., May 11, 1893.

GEO. M. STERNBERG, Surgeon-General, U. S. Army.

Approved:
DANIEL S. LAMONT, Secretary of War.

Appropriations for Marine-Hospital Service, 1895.

For marine hospital at Boston, Massachusetts: For invalid elevator, one thousand dollars; isolation ward, two thousand dollars; in all, three thousand dollars.

For marine hospital at Chicago, Illinois: For extension to hospital buildings, ten thousand dollars.

For marine hospital at Cincinnati, Ohio: For steam laundry plant, two thousand seven hundred dollars.

For marine hospital at New Orleans, Louisiana: For new laundry and attendants' building, five thousand dollars.

For marine hospital at Wilmington, North Carolina: For increase of hospital facilities by construction of new ward, seven thousand dollars.

Quarantine Stations.

For quarantine station, Reedy Island, Delaware River: For improvement of grounds to protect from overflow, four thousand two hundred dollars.

For quarantine station, Delaware Breakwater, Delaware: For naphtha launch for boarding vessels, four thousand dollars.

For quarantine station, Brunswick, Georgia: For completing addition to ballast wharf, three hundred dollars; ballast cars and tracks, three hundred dollars; hoisting engine, seven hundred dollars; raising trestle, two hundred and fifty dollars; in all, one thousand five hundred and fifty dollars.

For quarantine station, South Atlantic: For hospital barge (alteration to steamers), one thousand dollars; telephone, three hundred and fifty dollars; in all, one thousand three hundred and fifty dollars.

For quarantine station, San Francisco, California: For naphtha or steam launch, three thousand dollars; cistern for water supply, one thousand two hundred dollars; in all, four thousand two hundred dollars.

Quarantine Service.

For the maintenance and ordinary expenses, including pay of officers and employees of quarantine stations at Delaware Breakwater, Reedy Island, Cape Charles and supplemental station, South Atlantic Station (Sapelo Sound), Southport, Brunswick, Key West, Gulf, San Diego, San Francisco, and Port Townsend, one hundred and twenty-five thousand dollars.

Army Changes. Official list of changes in the stations and duties of officers serving in the Medical Department, U. S. Army, from March 9, 1895, to March 16, 1895.

Major CHARLES L. HEIZMAN, Surgeon U. S. A. (Ft. Douglas, Utah), is granted leave of absence for one month, to take effect about March 10, 1895.

First Lieut. GEORGE D. DE SHON, Asst. Surgeon, is relieved from duty at Ft. Logan, Colo., and ordered to duty at Ft. Douglas, Utah.

Capt. FREEMAN V. WALKER, Asst. Surgeon, is granted leave of absence for one month, to take effect upon his relief from duty at Ft. Trumbull, Conn.

Capt. PAUL CLENDENIN, Asst. Surgeon, leave of absence granted for seven days, is extended twenty-one days. The Attending Surgeon at Boston, Mass., will attend the sick at Ft. Warren, Mass., during the absence of Captain CLENDENIN.

Navy Changes. Changes in the Medical Corps of the U. S. Navy for the week ending March 16, 1895.

Asst. Surgeon L. L. YOUNG, detached from the Naval Hospital, Norfolk, Va., and wait orders.

Asst. Surgeon AMMEN FARENHOLT, ordered to the U. S. S. "Baltimore."

Marine-Hospital Changes. Official list of changes of stations and duties of medical officers of the U. S. Marine-Hospital Service, for the fifteen days ended March 15, 1895.

Surgeon JOHN GODFREY, detailed as chairman of board for physical examination of candidates, revenue cutter service, March 6, 1895.

Surgeon FAIRFAX IRWIN, to inspect Cape Charles Quarantine Station, March 9, 1895.

Surgeon F. W. MEAD, detailed as chairman of board for physical examination of candidates, revenue cutter service, March 6, 1895.

P. A. Surgeon A. H. GLENNAN, to report at Bureau for special temporary duty, March 14, 1895.

Asst. Surgeon C. H. GARDNER, to proceed to Angel Island Quarantine Station, for temporary duty, March 4, 1895. Detailed as recorder of board for physical examination of candidates, revenue cutter service, March 6, 1895.

Asst. Surgeon W. J. S. STEWART, detailed as recorder of board for physical examination of candidates, revenue cutter service, March 6, 1895.

Asst. Surgeon J. H. OAKLEY, detailed for duty on revenue steamer "Rush," March 13, 1895.

Asst. Surgeon H. S. CUMMING, to proceed to Boston, Mass., for temporary duty, March 6, 1895.

LETTERS RECEIVED.

Ashmead, A. S., Philadelphia, Pa.; Atkinson, W. B., Philadelphia, Pa.; Alta Pharmacal Co., St. Louis, Mo.

Bounnell, H. M., Waynetown, Ind.; Baskett, J. N. (2), Hannibal, Mo.; Baxter, W., Bangor, Me.; Brown, Warren, Tacoma, Wash.; Biddle, Jas. G., Philadelphia, Pa.

Clarke, The Robt. Company, Cincinnati, Ohio; Connor, Leartus, Detroit, Mich.; Crothers, T. D., Hartford, Conn.; Corr, A. C. (2), Carlinville, Ill.; Colegan, F. P., Chicago, Ill.

Dry Extract Co., Janesville, Wis.

Franklin, C. P., Philadelphia, Pa.; Freeman, Wm., Madison, Ind.; Frink, Geo. K., San Francisco, Cal.; Fuller, C. H., Advertising Agency, New York, N. Y.

Guild, C. H. & Co., Boston, Mass.; Gallup, Benj. E. (2), Chicago, Ill.

Hubbard, T. B. (2), Toledo, Ohio; Heuel, E., New York, N. Y.; Howe, Lucien, Buffalo, N. Y.; Hummel, A. L., Philadelphia, Pa.; Haughton, R. E., Midland, Texas.

Ingals, E. F., Chicago, Ill.

Jackson, Edward, Denver, Colo.

Krotoszyner, M., San Francisco, Cal.

Lanphear, E., St. Louis, Mo.; Leeds, Norman, Bellmont, Ill.; Lord & Thomas, Chicago, Ill.

McKennan, H., Paris, Ill.; Moffitt-West Drug Co., St. Louis, Mo.; Morris, Malcolm, London, Eng.; McMurtry, L., Louisville, Ky.; McDougal, J. G., New Lexington, Ohio; Moyer, H. N., Chicago.

New York Academy of Medicine, New York, N. Y.

Obetz, H. C., Detroit, Mich.

Penfield, R. C., New York, N. N.

Rand, D. H., Portland, Ore.; Ricketts, B. M., Cincinnati, Ohio.

Spofford, A. R., Washington, D. C.; Stevens, A. J., Malden, Mass.; Savage, G. C., Nashville, Tenn.

Treat, E. B., New York, N. Y.; Trimble, J. R., Baltimore, Md.; Thomas, C. P., Everett, Wash.

Western Publishing House, Chicago, Ill.; Warner, W. R. & Co., Philadelphia, Pa.; Wandless, H. W., Dallas, Texas; Woodbridge, J. E., Youngstown, Ohio.